

THE NEW EDUCATOR ENCYCLOPEDIA

*A Thoroughly Modern Work Designed to Meet the Needs
of Every Age*

•

EDITORIAL STAFF

ELLSWORTH D FOSTER, LL B.

*Associate Editor, New Practical Reference Library
Former Managing Editor, The World Book, Author
Cyclopedia of Civil Government*

JAMES LAUGHLIN HUGHES

*Author, and former Chief Inspector of Schools,
Toronto*

KARL H GOODWIN, AB

*Assisted by a Large Number of Contributors in all
Fields of Knowledge*

•

1937

DOMINION RESEARCH FOUNDATION
CALCUTTA

PRONUNCIATION

The pronunciation of titles is indicated by accenting the word or by respelling it phonetically in italics. In the phonetic spelling, letters are used to indicate the sounds which they most commonly represent.

A vowel is *short* when followed by a consonant in the same syllable, unless the syllable ends in silent *e*.

A vowel is *long* when standing alone or in a syllable which ends in silent *e* or when ending an accented syllable.

S is always soft, and never has the sound of *s*.

The foreign sounds which have no equivalent in the English language are represented as follows:

K for the German *ch*, as in *Bach*: (*Bach, baK*)

N for the French *n*, as in *Breton*: (*Breton, b'retōN*).

o for the German *o*, as in *Gottingen*: (*Gottingen, go'ting en*).

u for the German *u*, as in *Blucher*: (*Blucher, bluK'ur*).

Copyright

MCMXIX, MCMXXII, MCMXXIII,
MCMXXIV, MCMXXV, MCMXXVI,
MCMXXVIII, MCMXXX, MCMXXXII,
MCMXXXIII, MCMXXXIV, MCMXXXV,
MCMXXXVI

THE UNITED EDUCATORS, INC.
CHICAGO

Printed in U. S. A.



TURKEY, the name that for centuries was borne by one of the world's mightiest empires, when it bestrode three continents and from its throne of beauty at Constantinople swayed the destinies not only of millions of Turks but of many subject peoples held to an unwilling allegiance by the power of the sword. Under the white heat of religious zeal and fanaticism which taught that to kill an infidel or to die in a "holy" war was rewarded gloriously in the hereafter, the empire expanded until North Africa, Southwest Asia, and much of Southern Europe lay at the feet of the Mohammedan power.

It could not govern well. It despised the infidel—anyone not a follower of Mahomet. Tyranny, despotism, repression, and bloodshed in the course of time wrought its doom. As its alien peoples desperately began to free themselves from this overlordship, the empire started to shrink. How it lost its African domain in Egypt and Tripoli, the manner in which it was forced step by step out of Europe until only a tenuous foothold was retained along the Dardanelles and the Sea of Marmora, and its Asiatic realm was reduced until there remained only its old fertile stronghold on the Anatolian plateau (old Asia Minor)—these moving facts this article records, and more. The empire itself has disappeared, and on its ruins was erected a modern government, republican in form, liberal in outlook, known as the National State of Turkey. Population, 1927, 13,648,720.

A Look Backward. While the generation now coming to knowledge of world affairs sees a new Turkey trying to get in step with Western ideals and modern standards—and succeeding very well—the Turkey with which the passing generation is familiar was popularly known as the Ottoman Empire, so called

from Othman, or Osman, its founder. About the year 1300, by martial ability and valor, to which he added deceitful wiles, he reared an independent kingdom on the ruins of the Seljuk Turks, whom Christian Europe had come to know as its foe during the Crusades. Othman's followers were a tribe that had swarmed out of the unknown in Central Asia about fifty years before.

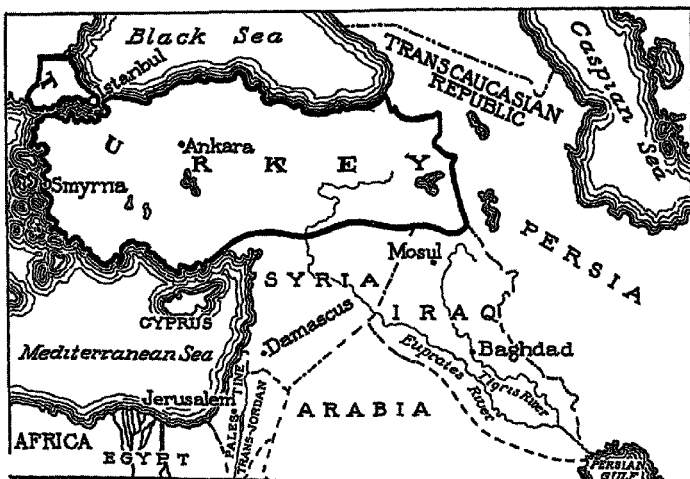
The spirit of conquest was strong in these early Ottoman Turks, and gradually they subjugated the Armenian peoples, absorbed the dependencies of the Eastern Roman, or Byzantine Empire, and fought their way into South Central Europe, and Africa. In the sixteenth century, when the power of the Ottoman Turk was at its height, the empire included Arabia, and the Asiatic possessions of the fallen Byzantine Empire, including Constantinople, Macedonia, Greece, Albania, Serbia, the provinces that became modern Rumania, Bulgaria, the Greek Mediterranean islands, Syria, Tripoli and Egypt. The Ottomans even gained a foothold in Hungary and in Italy, but after 1683 they were gradually pushed out of Europe. One by one the European provinces of Turkey gained their independence. In 1812 Italy by a successful war wrested Tripoli from Turkey, and at the close of the Balkan Wars, in 1913, the empire was shorn of all its European holdings except Constantinople, Adrianople, a small section adjoining these cities and a few islands in the Mediterranean.

Then came the World War. The interests of Germany and Turkey were closely related. The former had projected the Berlin to Baghdad Railway, and a part of it had been constructed through Turkish territory. Turkey reasoned with considerable assurance that the Germanic powers would win the war, and at its close, with Turkish participation on the side of the Central Powers, its world position would be greatly strengthened. It could be of material assistance to Germany, for even with the losses it had recently suffered, the empire covered more than 760,000 square miles, exclusive of Egypt, where it still exercised nominal authority. Hostilities were begun by Turkish bombardment of Odessa, and Russia declared war on Turkey, followed in the succeeding months by declarations by France and Italy, by a final declaration Turkey placed Rumania among its enemies. Between Great Britain and Turkey no declarations were made.

Changes During the World War Early in the World War the British annexed the island of Cyprus, and in 1915 declared Egypt a British protectorate. In 1916 the people of Hedjaz, a narrow strip of territory in Arabia, bordering on the Red Sea, revolted and set up an independent kingdom, this state has an area of 96,500 square miles and a population of 300,000. In 1917 Palestine was captured by the British, and by the end of the war all of Syria was under allied control. Mesopotamia fell into British hands in 1917, and when Turkey surrendered in

France and Great Britain with mandates to govern and prepare them for statehood.

Turkey and Its People. The discussion which follows is restricted to the genuinely Turkish portion of the old empire, namely, Anatolia, or Asia Minor. (For descriptive matter on the various parts of the former domain, see ARMENIA, ARABIA, PALESTINE, SYRIA, MESOPOTAMIA, EGYPT, etc.) *Anatolia* is derived from Greek words meaning *to rise*, a word chosen with reference to the elevated surface, and is the modern name for Asia Minor. The country includes the



TURKEY AND ITS ASIATIC NEIGHBORS

The area with boundary heavily shaded marks the limits of the present National State of Turkey. All that part of Asia west of Persia and south of Soviet Transcaucasia was a part of the Turkish Empire until after the World War.

the fall of 1918 practically Constantinople only was left to the Turk in Europe.

Turkey Dismembered. The part of the old empire that was predominantly Turkish was Anatolia, or Asia Minor. Thus the Allies determined should constitute the new Turkey, with the addition of the area surrounding Constantinople, on the European mainland, and a few small adjacent islands in the Aegean Sea. All other possessions were swept away, Palestine, Syria, and Mesopotamia (now Iraq) were given hope of eventual independence, but placed temporarily under

peninsula bounded by the Armenian highlands on the east, Syria and the Mediterranean on the south, the Aegean Sea on the west, and the Black Sea and Sea of Marmora on the north. In the interior the land is a series of plateaus, having an average elevation of 3,000 feet. Near the Mediterranean seacoast these uplands suddenly sink to the narrow belt of level land called the *Levant*. The plateaus are nearly bare of trees and are interspersed with salt plains, marshes and salty lakes. The land is here best adapted for grazing. Under irriga-

tion, however, the soil is productive. The strips of seacoast on the west, north and south are fertile and bear a luxuriant vegetation, including such fruits as prunes, olives and figs. Farming is practiced in the interior with considerable toil, and grains, cotton and tobacco are raised. Silk culture also receives attention.

The plateau is bordered on the north by a series of parallel mountains which run the whole length of the Black Sea. The greatest elevation, in the extreme east, is 12,000 feet. On the south is the Taurus range, following the Mediterranean coast, and having many peaks over 10,000 feet in height. These mountains are rich in minerals, but the mines have as yet been little developed. The mineral deposits of Anatolia include coal, lead, manganese, iron, gold, salt and petroleum, and they offer a promising field for capitalists when normal conditions return.

In Anatolia, as in other parts of the old Turkish domain, industry has long been in a backward state. The rural population which lives chiefly by farming and sheep raising, has suffered from misgovernment, lack of transportation facilities, ignorance and extortion of tax officials. Manufacturing in the modern sense is almost unknown, but Turkish artisans show great skill in producing copper and brass utensils, and, especially, hand-woven rugs. Cloth, olive oil and soap are made in limited quantities.

The Turkish peasants are naturally patient, hospitable and kind-hearted, it is the unscrupulous deeds of the ruling classes that have given rise to the feeling in Western nations expressed in the term, the "Unspeakable Turk." The Turkish people are all Mohammedans in religion, and are devoted followers of the Prophet. They are found in all parts of the old empire, both in Europe and Asia, but are nowhere numerically dominant except in Asia Minor. In the cities Greeks, Jews and Armenians are important in commercial life, but Turks have political control. Nomadic Turkomans, who are racially akin to the Turks, are found in the rural districts in large numbers. The chief cities include Smyrna, Scutari, Brussa, Adana, Trebizond and Adaha.

History of the Empire. The Ottoman Turks came originally from the region of the Altai Mountains, in central Asia, and in the sixth century A. D. they pushed onward to the west, in connection with other Turkish

tribes. Early in the eighth century they came in contact with the Saracens, from whom they took their religion, and of whom they were at first the slaves and mercenaries. In the thirteenth century they appeared as allies of the Seljukian Turks against the Mongols, and for their aid they received a grant of lands in Asia Minor. Othman or Osman, the son of their leader, Ertogral, became the most powerful emir of Western Asia, and after the death of the Seljuk sultan of Iconium in the year 1300, he proclaimed himself sultan. Thus was founded, upon the ruins of the Saracen, Seljuk and Mongol power, the Empire of the Osman, or Ottoman Turks, in Asia. After Osman, the courage, policy and enterprise of eight great princes, whom the dignity of caliph placed in possession of the standard of the prophet, and who were animated by religious fanaticism and a passion for military glory, raised the Empire to the rank of the first military power, in both Europe and Asia (1300-1566).

Period of Expansion. The first of these princes was Orkhan, son of Osman. He subdued all Asia Minor to the Hellespont and was the first to organize the Turkish power. Orkhan's son, Soliman, first invaded Europe in 1355. In 1361 Orkhan's second son and successor, Amurath I, took Adrianople, which became the seat of the empire in Europe, and he later conquered Macedonia, Albania and Serbia and defeated a great Slav confederation, under the Bosnian king Stephen, at Kosovo. Bajazet (ruler from 1389 to 1402) invaded Thessaly and advanced toward Constantinople. In 1396 he defeated the Western Christians under Sigismund, king of Hungary, at Nicopolis, in Bulgaria; but at Angora, in 1402, he was himself conquered and taken prisoner by Timur, who divided the provinces between the sons of Bajazet. Finally, in 1413, the fourth son of Bajazet, Mohammed I, seated himself upon the throne of Osman. Mohammed was succeeded by his son, Amurath II (1421-1451), who defeated Ladislas, king of Hungary and Poland, at Varna in 1444. Mohammed II, the son of Amurath, completed the work of conquest (1451-1481). He attacked Constantinople, which was taken on May 29, 1453, and the Byzantine Empire came to an end. After that time Constantinople was the seat of the Sublime Porte, or Turkish government. Mohammed added Serbia, Bosnia, Albania

and Greece to the Ottoman Empire, and threatened Italy, which was freed from danger by his death. His grandson, Selim I (Sultan from 1512 to 1520), conquered Egypt and Syria. Under Solymann II (1520-1566), the Ottoman Empire reached the highest pitch of power and splendor, but after his time, the race of Osman degenerated, and the power of the Porte declined.

Period of Decline. During the latter part of the sixteenth century and most of the seventeenth century, the chief wars which Turkey waged were with Venice and with Austria. The Battle of Lepanto in 1571, in which the Ottoman fleet was overthrown by the combined fleets of Venice and Spain, was the first great Ottoman reverse at sea, and the Battle of Saint Gotthard, in 1684, in which Montecucoli defeated the Vizier Kumpirli, the first great Ottoman reverse on land. In 1683 Vienna was besieged by the Turks, but it was relieved by John Sobieski, and in 1697 the Turks were defeated at Zenta by the Austrians under Prince Eugene. Two years after this defeat, the Peace of Karlowitz was signed, by which Turkey agreed to renounce its claims upon Transylvania and a large part of Hungary, to give up the Morea to the Venetians, to restore the Ukraine to Poland and to leave Azov to the Russians. Eugene's subsequent victories at Peterwarden and Belgrade obliged the Porte, by the Treaty of Passarowitz, in 1718, to give up Belgrade, with a part of Serbia and Wallachia, but the Turks, on the other hand, took the Morea from Venice, and by the Treaty of Belgrade, in 1739, they regained Belgrade, Serbia and Little Wallachia, while for a time they also regained Azov.

Russia, which had been making steady advances under Peter the Great and subsequently, now became the great opponent of Turkey. In the middle of the eighteenth century, the Ottoman Empire still embraced a large part of southern Russia. The victories of the Russians in the war between 1736 and 1744 determined the political superiority of Russia, and compelled Turkey to renounce all sovereignty over the Crimea, to yield to Russia the country between the Bog and the Dniester and to open its seas to the Russian merchant ships. By the Peace of Jassy, 1792, which closed the war of 1787-1791, Russia retained Tauride and the country between the Bug and the Dniester and gained some accessions in the Caucasus.

In the long series of wars which followed the French Revolution, the Ottoman Empire was first opposed to France, in consequence of Bonaparte's campaign in Egypt, and later to Russia, which demanded a more distinct recognition of its protectorate over the Christians. By the Peace of Bucharest in 1812, Turkey ceded to Russia the country between the Dniester and the Pruth. Further disputes ended in the Porte making additional concessions, which tended toward loosening the connection of Serbia, Moldavia and Wallachia with Turkey. In 1821 the war of Greek independence broke out. In 1826 the massacre of the Janizaries took place at Constantinople, after a revolt. In 1828 the Russians crossed the Balkans and took Adrianople, the war being terminated by the Peace of Adrianople in 1829. In 1831 Mahomet Ali, nominally pasha of Egypt, but real ruler both of Egypt and Syria, levied war against his sovereign and threatened Constantinople, but the Russians, who had been called on for aid by the sultan, forced the invaders to desist. In 1839 Mehemet Ali again rose against his sovereign, but through the active intervention of Austria, Great Britain and Russia, he was compelled to evacuate Syria, though he was recognized as hereditary viceroy of Egypt.

The next important event in the history of the Ottoman Empire was the Crimean War. In 1875 the people of Herzegovina, unable to endure longer the misgovernment of the Turks, broke into rebellion. A year later the Serbians and Montenegrins likewise took up arms, and though the former were unsuccessful and obliged to abandon the war, the Montenegrins still held out. Meantime, the great powers of Europe were pressing reforms on Turkey, and at the end of 1876 a conference met at Constantinople, with the view of making a fresh settlement of the relations between Turkey and the Christian provinces. All the recommendations of the conference were, however, rejected by Turkey; and in April following, Russia, which had been coming more and more prominently forward as the champion of the oppressed provinces and had for months been massing troops on both the Asiatic and the European frontier of Turkey, issued a warlike manifesto and commenced hostile operations in both parts of the Turkish Empire. The final settlement of this war was effected by the Treaty of Berlin.



Ewing Galloway



Parliss & Atlantic

THE OLD AND THE NEW IN TURKEY

Above A picturesque street scene in the ancient city of Angora, the capital of modern Turkey

Below Old and new costumes of Turkish women, the two at the right in modern costumes without veils, permitted under the present régime



**THE MOSQUE OF ST SOPHIA, NOW MOSQUE MEHMEDIE,
ISTANBUL, TURKEY**

It stands today as the most famous example of Byzantine architecture. Built for a Christian Church by the Roman Emperor Justinian the Great, it was completed in 538. The dome is the most impressive feature of the structure. It is 180 feet high and 107 feet in diameter, and is supported on four arches, each having a span of about 100 feet. The interior is finished with marble and beautiful mosaic.

The main events in the history of the Ottoman Empire from the Treaty of Berlin to the year 1890 were the treaty with Greece, executed under pressure of the great powers in 1881, by which Turkey ceded to Greece almost the whole of Thessaly and a strip of Epirus, the occupation of Egypt by Great Britain in 1882, and the revolution at Philippopolis in 1885, when the government of Eastern Rumelia was overthrown, and the union of that province with Bulgaria was proclaimed in July, 1894. Constantinople was visited by a series of earthquakes, which lasted eight days, two or more occurring each day. Great damage was done to the city and surrounding country, and hundreds of people were killed.

For a number of decades the Turkish government had frequent revolts to deal with. The massacres occasioned by these uprisings aroused the sympathy of America and Europe, but the European powers would not interfere because it was believed that such interference might cause a general upheaval in Europe. In July, 1908, the Young Turks succeeded in a revolution which compelled the sultan to grant a constitution. The first Parliament under this constitution met in 1909. In April the troops in Constantinople revolted against the Young Turks, but troops from the country near by rushed to the capital, and gained control of the city. Abdul Hamid was compelled to abdicate, and his younger brother, Mohammed Rehad Effendi, ascended the throne with the title of Mehmed, or Mohammed V. In 1912 Turkey lost Tripoli to Italy, resulting from a war of aggression on the part of the latter. Hardly had peace been arranged between Italy and Turkey, when the war against Turkey was declared by the allied Balkan states. After several months of warfare the European powers interfered to end the struggle, and on May 30, 1913, Turkey accepted the terms of the Treaty of London. In October, 1914, Turkish warships bombarded the Russian port of Odessa, probably as the result of an agreement with Germany. This act, after reparation was refused, was accepted by Russia and its allies as a cause for war.

The World War and Its Effects (See WORLD WAR, for military operations). Turkey's mistreatment of the Armenians, nearly two million of whom were massacred or deported (see ARMENIA, for report of American Relief Committee), was a blot on

Turkey's record, and abhorrent to all nations. In October, 1918, Turkey surrendered to the Allies, and the Ottoman Empire came to an end. Mohammed V died late in 1918, and was succeeded by his son, Mohammed VI, who remained in Constantinople, which came under control of the Allies, while the Great National Assembly (convened in April, 1920) sitting at Angora exercised the functions of a parliament, as well as of supreme executive authority, in the *de facto* government set up by Mustapha Kemal Pasha. Until the fall of 1922, this government controlled all of Asia Minor not in foreign occupation. In the fall of 1922, the Turkish army under Kemal Pasha defeated the Greeks and captured Smyrna, recovering this section of Asia Minor which had been awarded to Greece. Kemal Pasha followed up this victory by demanding and receiving Constantinople and Adrianople, but the powers decreed that the straits should be internationalized. However, in 1936 the Dardanelles was again fortified by Turkey.

Related Articles: Consult the following titles for additional information

CITIES	
Adrianople	Constantinople
Angora (Ankara)	Smyrna
HISTORY	
Abd-ul-Hamid	Gallipoli
Balance of Power	Kemal Pasha,
Balkan Wars	Mustapha
Berlin Congress of	Mohammed V
Bosporus	Russia
Byzantine Empire	Russo-Turkish War
Crimean War	Seljuks
Dardanelles	World War

TURKEY, a large game bird of the pheasant family, native to North America. There are only two species; one is found in Yucatan and Central America, and the other is the common wild turkey of Mexico and the United States. The wild turkey is a tall, handsome bird, the full-grown male weighing from ten to twenty-five pounds. The brilliant plumage has copper, bronze and green reflections. The head and neck are bare of feathers. The male, which is larger than the female, has a tuft of bristly feathers hanging from its breast. These birds feed on insects, seeds, berries and other small fruits. The nests are placed on the ground, and the eggs, twice the size of a hen's egg, are creamy white. One brood, usually consisting of about twelve, is reared a season. A second brood is raised only in case the first comes to grief. The birds are becoming rapidly exterminated. The domestic

turkey, which is derived from the Mexican wild turkey, is less brilliantly colored. Turkeys require about the same care as chickens. See **GAME**, color plate

TURKEY BUZZARD, or **TURKEY VULTURE**, the commonest of American vultures, so named because at a distance it resembles a turkey in appearance. The turkey buzzard is about two and a half feet long, and its wings extend to about six feet in breadth. It lives in most of the warmer regions of the United States and extends its habitat through Mexico and South America.

TURKMENISTAN. See **TURKESTAN**.

TURKS, a race of Mongolo-Talai origin, widely disseminated throughout Western and Northwestern Asia and Southeastern Europe. They are divided into the Ottoman Turks, Turkomans, Kirghizes, Usbecks, Yakuts and other tribes. The Ottoman Turks developed in the Middle Ages to commanding military and political power, but have since greatly declined.

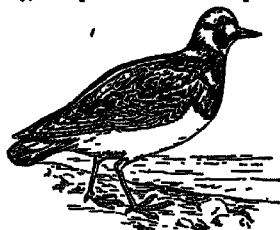
TURMERIC, an aromatic plant, native to Southern Asia, also a yellow dye prepared from its roots. Turmeric is used as a condiment in the Orient, being an important ingredient in curry powder. It is also useful in chemistry, in making test papers.

TURNER, JOSEPH MALLARD WILLIAM (1775-1851), an English landscape painter, member of the Royal Academy, first celebrated as a landscape painter in water colors and later in oils. In the first half of the nineteenth century he exhibited at the Academy more than two hundred pictures, easily becoming the most popular landscape painter of the English school. His works claim special merit because of their fine coloring effects. Details are often wanting, and drawing is imperfect, but the idealistic effect is unsurpassed. During the latter period of his work, however, he fell into a vague trifling with effects of light and shade and color, which somewhat lessened his great reputation. He bequeathed most of his pictures and sketches to the nation, on condition that a suitable building be erected for their reception. They have been placed in the Turner Gallery, occupying two rooms in the National Gallery in London. Some of his most noted paintings are *Slave Ship*; *The Fighting Temeraire*; *Rain, Steam and Speed on the Great Western Railway*; *Hannibal and His Army Crossing the Alps*, and *The Garden of the Hesperides*.

TURNER, NAT (about 1800-1831), an American negro slave, born in Southampton County, Va., who from earliest childhood claimed to be chosen and inspired for the accomplishment of a great purpose. In 1828, he declared that at a certain sign he would lead an insurrection against his enemies. In 1831, at an eclipse of the sun, he began carrying out this plan by killing five members of his master's family. Joined by other slave recruits, he continued the massacre until every person in the neighborhood had been murdered. On the following day the insurrection was broken up by a band of white men and by the arrival of Federal troops. Turner was captured October 30 and executed within a few days. The insurrection, known as the Nat Turner Insurrection, resulted in the passage of stringent laws for the management and punishment of slaves in most of the Southern states.

TUR'NIP, a biennial plant of the mustard family, much cultivated on account of its fleshy root. It was well known to the Greeks and Romans, and has been used as a vegetable in all temperate climates, being cultivated on a large scale in some countries as food for stock. Turnips may be planted succeeding the harvest of a crop of wheat or oats.

TURNSTONE, a shore bird of the plover family, with pied black and white plumage,



TURNSTONE

varied with rufous and ash, taking its name from its habit of turning up small stones in search for marine worms, minute crustaceans, etc., for food. It is found in almost every part of the globe during migrations, and breeds on rocky coasts in the Arctic regions, cunningly concealing its eggs, four in number, among the sparse Arctic vegetation.

TURNVEREIN, *turn's fer me*, German athletic organizations first established by Friedrich Ludwig Jahn about the beginning of the nineteenth century, and exerting an

enormous influence in building up a vigorous and hardy German population after the Napoleonic wars. In America turpenteries were first organized by German refugees in Philadelphia and Cincinnati, in 1848. They were subsequently extended to other cities with large German populations, the total membership attaining to about 40,000.

TURPENTINE, the distilled gum of the pine tree. Turpentine is manufactured by collecting the gum, or crude turpentine, from the trees and distilling it in copper vessels. The season begins when the first spring sap rises, and it ends when winter checks the flow of the sap. In January or February the trees are hacked. The hacks are about six inches deep, they are cut near the roots of the tree, and as close together, to the height of a man's head, as can be done without killing the pine. The hacker leaves a width of bark between each cut, so as to preserve the vitality of the tree. The sap or gum, fills the cuts with a clear, sticky, thick fluid, and this is removed with a dipper. The sap is deposited in barrels, which are scattered through the woods. The first sap which flows in the spring makes the best resin, and the poorest is the product of the hardened gum which is left on the sides of the cuts. This is removed by the *scraper*, who moves through the woods gathering the leavings.

The still is a copper vat, hooded, with a close-fitting, air-tight cover, in which is a funnel, which, in turn, is connected with the *worm* of the still (see **DISTILLATION**). This worm runs down into another vat, near at hand, and in this vat the fumes, or vapor, of the heated gum are distilled into turpentine. Fire under the copper vat heats the gum, and the volatile parts rise to the funnel, pass into the still and are condensed by the water in the second vat into spirits of turpentine. The residuum left in the vat is the rosin of commerce, which is passed through a series of strainers and sieves to the barrels, which are made on the spot. The turpentine cannot be barreled so easily, for it will work through an ordinary barrel. It is placed in white pine barrels, which have been coated inside with several coats of strong, hot gine, which keeps the turpentine from soaking into the wood. The trees are worked for five or six seasons. All the turpentines dissolve in pure alcohol, and by distillation they yield oils, which are termed *spirits of turpentine*. Oil, or spirits, of turpentine is used to a

limited extent in medicine. It is also much used in the arts, for dissolving resins and oils in making varnishes. See **RESINS**, **ROSIN**.

TURQUOISE, *tur'kooz*, a precious stone, of beautiful blue or green color due to the presence of copper. It is capable of taking a high polish, and has long been a favorite gem in the East, especially in Persia, where the finest specimens are found. When exposed to fatty acids, the turquoise loses its color and turns greenish, thus leading to the Oriental superstition that its dullness foretells misfortune. *Bone turquoise* is an imitation turquoise, composed of fossil bone.

TURTLE, a name given to reptiles that differ but little from tortoise, in fact, *turtle* is the name commonly given to both forms. The shell which encloses the body of the turtle is in two parts, the upper portion called the *carapace*, the lower, the *plastron*. Turtles have no teeth, but the jaws have a tough, horny skin. The food of some turtles is marine plants, others feed on insect larvae, fish and mollusks. They deposit their eggs usually in holes in sandy places, cover them with sand, and leave them to be hatched by the warmth of the sun. The young begin to crawl on leaving the egg, and soon find water. Turtles are found in the seas of warm climates, and in many inland lakes and rivers. The most important species is the *green turtle*, which is from six to seven feet long and weighs from 700 to 800 pounds. It is found in the West Indies, and is brought to the United States for its food value. See **GALAPAGOS**, for reference to turtles.

Mud Turtle, the name commonly applied to small turtles of aquatic habits which prowl about the muddy bottoms of rivers and ponds in search of food. The common mud turtle is about four inches long, dull olive or brown above and yellow or pale brown below. Other species include the *Louisiana*, the *yellow-necked* and the *Mexican*.

Related Articles. Consult the following titles for additional information:
 Leatherback Terrapin Tortoise
 Snapping Turtle

TURTLE DOVE, *dove*, a small European pigeon, pale grayish-brown in color, marked with a darker hue above and with a purple tinge on the feathers of its breast. Its cooing note is plaintive and tender. Its nest is loosely built in the crotch of a low tree or bush. The eggs are creamy-white, and are two in number. The similar North American species is known as the *mourning dove*.

TUSCALOOSA, *tus ka loo' sah*, ALA, the county seat of Tuscaloosa County, fifty-six miles southwest of Birmingham, is in a rich cotton-growing and coal-mining region. The chief industrial establishments are cotton gins and compresses, iron works, lumber and flour mills, machine shops and creameries. The University of Alabama is a mile north of the city. Airports are maintained by the city and by the Federal government. The city was the capital of the state from 1826 to 1846 and the old capitol building is still a feature of interest. The place was settled in 1812 and incorporated in 1816. The commission form of government was adopted in 1912. Population, 1930, 20,659.

TUSCANY, *tus' ka ni*, a small department or province of Northern Italy. It comprised ancient Etruria, and the Etrurians (Etruscans) were the earliest known inhabitants of the peninsula. They became subject to Rome in the fourth century B C. During the period of barbarian migrations they were overcome in turn by the Ostrogoths, the emperors of Constantinople and the Lombards. In the Middle Ages several of the cities of Etruria, notably Florence, Pisa and Genoa, became independent and prosperous, and in the latter half of the sixteenth century the Florentine possessions were formed into the Grand Duchy of Tuscany. From 1745 to 1859 Tuscany was under the rule of Germany, in 1861 it became by vote of its population a part of the kingdom of Italy.

Among the noted names of natives of Tuscany are the Medici, Giotto, Boccaccio, Dante and Petrarch. The dialect of Tuscany became the classical language of Italy.

TUSCARORA, *tus ka ro' rah*, a migrating Iroquoian tribe, which finally settled in New York and was received as a sixth member in the confederacy. See FIVE NATIONS, THE.

TUSKEGEE, *tus ke' gee*, **NORMAL AND INDUSTRIAL INSTITUTE**, an industrial school for negroes, established in 1881 by the state legislature at Tuskegee, Ala. It began its sessions in a small church, and the thirty pupils were all taught by Booker T. Washington. The institution has enjoyed wonderful prosperity, and now owns 2,300 acres of land, scores of buildings and much valuable equipment. The endowment has been built up from \$2,000,000 to more than \$10,000,000, in 1936. There are about 1,600 students and a faculty numbering about 180. Until his death in 1915, Booker T. Washington continued as

head of the school, and to him is due much of the credit for its marvelous growth.

The object of the institute is to furnish its students with an education fitting them to become proper leaders of the people of their own race, and thus to bring about better moral and material conditions. The studies of the academic department are closely associated with the practical work in the shops and fields. See WASHINGTON, BOOKER T.

TUS' SOCK MOTH, a family of moths named from the tufts of hairs, often brightly colored, appearing in the caterpillars. The moths are dull-colored, and the females of some species are wingless. Several varieties of this moth are very destructive to fruit, and shade trees, and forest trees, notable among these being the *gypsy moth*, the *browntail moth* and the *white-marked tussock moth*. Of the latter there are two or three generations each summer, and the young caterpillars are extremely voracious. Trees are protected against these moths by winter pruning and burning of the cocoons, and by summer spraying and banding of trees. See GREY MOTHS.

TUT-ANKH-AMEN, a pharaoh (or king) of ancient Egypt, who reigned about 1,400 B C. The finding of his tomb in the Valley of Kings, near Thebes, is called the greatest archaeological exploit of modern times. The expedition which discovered and opened this tomb was led by Lord Carnarvon of England, and Howard Carter, an American archeologist. The tomb and contents were opened and revealed to the world in 1923. Rare and priceless relics were disclosed.

TWAIN, MARK. See CLEMENS, SAMUEL LANGHORNE.

TWEED, a twilled wool or wool-and-cotton fabric for men's wear, with an unfinished surface and of two colors, usually combined in the yarn. It is largely manufactured in Southern Scotland and takes its name from the Tweed River, along which it was first made.

TWEED, a river of Great Britain, ninety-five miles in length, rising in the southeastern part of Scotland and flowing easterly and northeasterly into the North Sea. The lower part of its course forms a part of the boundary between Scotland and England.

TWEED, WILLIAM MARCY (1823-1878), an American politician, notorious as the leader of the famous "Tweed Ring" in New York City. As a member of the famous

Tammany Hall, he gained immense influence and with the help of several unscrupulous supporters formed a combination for the political control of New York City. By the bribery of legislators and judges, bills were passed and decisions rendered which allowed the ring to carry out vast schemes of improvement, through which, by the padding of pay rolls and the auditing of fraudulent bills, they gained immense wealth. The régime lasted for more than six years, during which time the debt of the city was increased from \$20,000,000 to \$101,000,000. Finally, in 1871, through an exposure by the New York Times and a vigorous prosecution under a committee led by Samuel J. Tilden, the ring was broken up. Tweed was twice tried, finally convicted and sentenced to twelve years' confinement in the penitentiary and a fine of more than \$12,000. He was released two years later on a legal technicality, but was immediately rearrested on a suit for damages to the amount of more than \$6,000,000. While confined in jail awaiting trial, he escaped and fled to Spain. Finally, being captured, he died in jail.

TWEEDSMUIR. See BUCHAN, JOHN.

TWELVE TABLES, LAW OF THE, the earliest written code of law among the Romans. According to tradition it was drawn up to appease the plebeians, who had complained that they were not getting justice from the patrician judges. In 451 B. C., ten magistrates, called *decemviri*, were elected to draft the laws, and the following year they submitted these to the people. The laws were afterwards written on brass tablets and placed in the Forum, over the orator's platform, where everyone might read them. These laws formed the basis of Roman legislation for centuries.

TWILIGHT, twi'lite, the glow in the sky before sunrise and after sunset. Twilight is caused by the refraction of the sun's rays as they pass through the atmosphere. The evening twilight is brightest immediately after sunset and continues to fade until the sun reaches 18° below the horizon, when twilight ceases. The time required for the sun to reach this point varies in different latitudes. In the torrid zone, where the sun's path throughout the year takes nearly the same direction as the parallels, twilight is of short duration, but in summer its duration increases toward the Poles, and near the Arctic Circle it lasts all night.

TWILIGHT SLEEP, the name commonly applied to a method of applying anesthetics during childbirth. It originated at the hospital at Freiburg, Germany, and has been attempted, with varying success, in other countries. The Freiburg method consists in the administration of measured doses of morphine and scopolamine, these being given at specified intervals. Under ideal conditions, and when the method operates successfully, the patient comes out of the ordeal with no recollection of pain. Undoubtedly in successful cases the mother is greatly benefited by the method, as the elements of shock and exhaustion are reduced to a minimum. Twilight sleep has been tried in the best hospitals in America, but the results have not always been satisfactory, though it is practicable in certain selected cases. Few physicians recommend methods of delivery which preclude all possible assistance from the mother. Premature adoption of twilight sleep might result in great harm.

TYCHO BRAHE, tē'lo bra'hē, or *brah*. See BRAHE, TYCHO.



Grave, Richmond, Virginia.

TYLER, JOHN, (1790-1862), the tenth President of the United States, and the first "accidental" President, so-called because as Vice-President he succeeded automatically to the higher office through the death of the duly-elected executive.

Early Career. Tyler was a Virginian, born at Greenway, March 20, 1790, the son of John Tyler, Sr., who was at various times judge of state and Federal courts, speaker of the Virginia house of delegates and governor of the state. The future President was fortunate in his ancestry. By the time young Tyler was nineteen years of age he was a practicing attorney, and when twenty-one was a member of the state legislature, where he served for five consecutive terms, leaving that post only to go to Congress, to which he was elected in 1816, as a Democrat.

After two terms in Congress, he was returned to the state legislature in 1823, and two years later became governor of Virginia, the state promoting the son to the post with which it had once honored his father. After

two terms as governor, Tyler was elected to the United States Senate, in which body he took his seat in 1828.

Independence had been his chief characteristic in political life, though he was a Democrat, not always did he support the Democratic program. In the Senate the nation found him to be a stubborn man, who could not be moved from a position once deliberately taken. He came prominently into notice by opposing the tariff measures of 1832 and 1833, and was the only Senator to oppose the Force Bill of 1832. He had supported Jackson for the Presidency, but in 1834 made a report censuring the President for removing deposits from United States banks. The Virginia legislature ordered him to vote to expunge the vote of censure, but this Tyler refused to do, and soon he resigned from the Senate and retired to private life.

He became a leading member of the new Whig party, and sought to have the party name him for the Vice-Presidency in 1836. This effort failed, but in 1840 a chain of circumstances gave this former Democrat the coveted office. He was nominated on the Whig ticket with William Henry Harrison, the choice of Tyler being largely attributed to the Whig desire to secure the votes of Democrats who were dissatisfied with the two preceding administrations, which had brought upon the country the panic of 1837. Harrison and Tyler received 234 electoral votes; the opposition, 60. On March 4, 1841, the new administration assumed control of the government, and on April 4 President Harrison died.

Tyler as President There was a stronger man than Tyler in official Washington, this was Henry Clay, the acknowledged leader of the Whigs. Clay looked upon the Presidential election as a vindication of his course in politics, Tyler considered the result to be merely a rebuke of the preceding administration. There was soon a clash of factions, and Tyler, the President and nominal leader, broke with the party.

The incident which caused the breach was legislation respecting a second United States Bank. Tyler approved the abolition of the sub-treasury system, but would not consent to another United States bank, which Congress favored. Twice he vetoed a bank bill, after this second refusal to carry out the wishes of the party all the Cabinet resigned, with the exception of Daniel Webster, who

Administration of John Tyler, 1841-1845.

I. JOHN TYLER

- (1) Birth
- (2) Parentage
- (3) Education
- (4) Early career
- (5) Public life after breach with Jackson
- (6) Career after end of his term
- (7) Character
- (8) Death

II. GOVERNMENTAL AFFAIRS

- (1) Domestic
 - (a) President's quarrel with Whigs
- (2) Results
 - (a) Resignation of Cabinet
 - (b) Tyler read out of his party
- (3) Foreign
 - (a) Webster - Ashburton Treaty
 - (1) Negotiators
 - (2) Settled Maine boundary dispute
 - (3) Other settlements

III. INTERNAL AFFAIRS

- (1) Dorr's Rebellion
 - (2) Patron War
 - (3) The Mormons
 - (a) At Nauvoo
 - (b) In Utah
 - (4) Dedication of Bunker Hill Monument
 - (5) Construction of first telegraph line
 - (6) Discovery of copper
- Questions on Tyler

When and where was John Tyler born?

What public offices did he hold before his inauguration as President?

What were Tyler's views on internal improvements?

Why did the Whigs resign from the Cabinet?

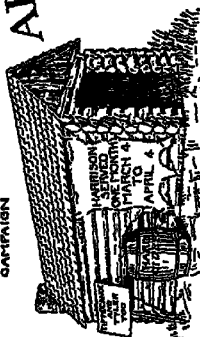
Why was the South anxious to annex Texas?

Who was Lord Ashburton?

What disputes did the Webster-Ashburton Treaty settle?

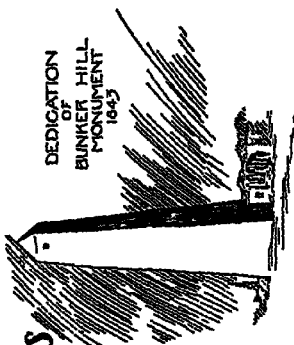
Explain Dorr's Rebellion

LOS CASIN
CAMPAIGN

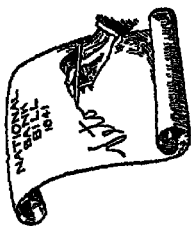


ADMINISTRATIONS OF HARRISON AND TYLER 1845

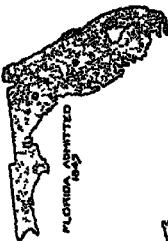
DEDICATION
OF
BUNKER HILL
MONUMENT
1845



FIRST
TELEGRAPH LINE
1846



IMPORTANT EVENTS
DORR'S REBELLION - 1842
SCREW PROPELLER INTRODUCED INTO U.S. NAVY - 1844
TROUBLE WITH MORMONS - 1844



FLORIDA ADMITTED
1845



WEBSTER-ASHBURTON
BOUNDARY TREATY
1842



COPPER DISCOVERED
IN
MICHIGAN
1844

wished to conclude the Webster-Ashburton Treaty, then the subject of negotiation

Most of the Whigs thereafter refused to recognize Tyler as a party leader. The Democrats rallied to his support, however, and in the Congressional elections of 1842 they overthrew the Whig majority and established themselves in the House by a majority of sixty-one—a change of eighty-six votes.

Legislation for the remainder of the Presidential term was in part a matter of compromises, the Whigs did not again press the bank act, and on some measures they acted with the President. A protective tariff bill was passed. Two river and harbor bills were presented, one for the eastern part of the country and another for the western section, the former being vetoed and the other signed by Tyler, because it contained appropriations for the Mississippi River, which he believed would be a national, not a sectional, benefit. The Webster-Ashburton Treaty was one of the outstanding features of the administration. Texas was annexed to the Union on March 3, 1845, the day before Tyler's term ended. Other and minor events are listed in the accompanying outline.



JOHN TYLER

As Ex-President.

After his retirement from office Tyler spent several quiet years on his estate, three miles from his birthplace. The threat of civil war called him again into public life, and in February, 1861, he presided over a convention of the border states, held in Washington, D. C., and called to consider the situation presented by the secession of South Carolina. When Congress refused to accept the recommendations of the convention Tyler urged his own state to secede, and in the fall of 1861 he was elected to the Confederate Congress. In January, 1862, he died, and was buried in Hollywood Cemetery, Richmond. In 1914 Congress appropriated \$10,000 for the erection of a monument in his memory.

Related Articles. Consult the following titles for additional information:
Force Bill
Harrison, William H.
Treaty
Webster-Ashburton

TYLER, TEX., the county seat of Smith County, about 100 miles southeast of Dallas,

on the Saint Louis Southwestern and Missouri Pacific railroads. There is an airport. The city is the center of fruit-growing in Eastern Texas. It ships large quantities of cotton, fruit and garden products. Industrial establishments include railway shops, canneries, box and crate factories, ice works, an oil mill, overall factories, fertilizer plants, and potteries. The city has a junior college. Noteworthy structures are a city hall, a Federal building, a Carnegie Library and a railroad hospital. The place was settled in 1846, and was chartered as a city in 1875. The city has long been governed on the commission plan. Population, 1920, 12,085, in 1930, 17,113.

TYLER, WAT, an English soldier, in 1381 a leader of what is known as *Wat Tyler's Rebellion*. When a poll tax was levied on the already overburdened English people, riots broke out, and a mob, led by Tyler, marched on London, pillaging as it went. The young king, Richard II, rode out to meet the rebels. He promised to grant them charters of freedom and amnesty and many of them, satisfied, dispersed. But Tyler, growing bold and insolent, made further demands, and William Walworth, mayor of London, stabbed him. The liberties granted were soon revoked, but the movement had the effect of hastening the general tendency toward the abolition of villenage.

TYNDALE, THOMAS, WILLIAM (1524-1536), an English reformer and translator of the Bible. He studied at Oxford and Cambridge and was ordained priest about 1521. Having made himself unpopular by the expression of certain heretical sentiments, he left England for the continent in 1524. After a visit to Luther at Wittenberg, he settled at Cologne, where he completed a translation of the New Testament, and on his expulsion from Cologne, he took refuge in Worms, where, in 1525, his translation was published. He translated the *Pentateuch* and the book of *Jonah*. When he openly opposed the divorce of Henry VIII from Catharine of Aragon, he was imprisoned in the castle of Vilvorde, near Brussels, and after a trial for heresy, he was strangled and his body was burned. In addition to the works mentioned, he wrote *The Obedience of a Christian Man* and *How Christian Rulers Ought to Govern*.

TYNDALL, JOHN (1820-1893), an Englishman and one of the world's greatest physicists, was born at Leighlin Bridge. He

was largely self-taught, gaining his first scientific training as an ordnance surveyor

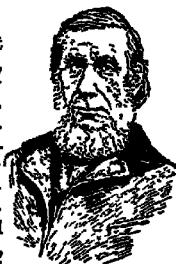
and railway engineer. After teaching mathematics at Queenwood College, he went to Germany for study and received a doctor's degree from the University of Marburg. He became a professor of natural philosophy at the Royal Institution in 1853, and on the death of Faraday was appointed director.

While he gave his chief attention to a study of radiant heat, he also made important experiments with light. In 1872 and 1873 he lectured in America.

Especially noteworthy was his effort to popularize science—to bring it within the reach of ordinary men. *Fragments of Science for Unscientific People*, *The Glaciers of the Alps* and *Hours of Exercise in the Alps* are among his "popular" writings. Other noteworthy books are *Heat as a Mode of Motion*, *Lectures on Light*, *On Sound* and *Contributions to Molecular Physics in the Domain of Radiant Heat*.

TYPE, a piece of metal, wood or other material, on one end of which is cast or engraved a letter, figure or other character. The earliest types were made of wood, and in style they resembled the script letters used in copying books before the invention of the art of printing. The parts of a type are (1) the body, (2) the face, (3) the shoulder,

(4) the neck and (5) the groove. The face is that part that does the printing; the neck is to show the right side of the type when set, and the groove is to make it stand firmly on its base. In the early days of printing, each printer made his own type, but with the extension of the industry, type casting, or foundry, became a business by itself. A few of the large types used in printing are still made of wood, but all others are of type metal, which is an alloy, consisting of three



JOHN TYNDALL

parts of lead to one part of antimony, with a small quantity of tin and copper added.

Type are cast by machinery. A steel die, which is an exact pattern of the letter, is first made. This is driven into a piece of soft copper, so as to form a perfect impression of the letter. This is called the *matrix*. The matrix is then placed in a metallic box, called the *mold*. This is placed in the type-casting machine, which opens and closes the mold and fills it with type metal. The metal hardens instantly, and when the mold opens the type drops out. The face is then smoothed on a stone, and the body is necked and grooved. The type are then tied up in packages, each of which contains only one kind of letter, and are ready for use. All types are ninety-two hundredths of an inch high.

A complete assortment of type is called a *font* and contains large and small capitals, small letters and italics, marks of punctuation and figures, in all, there are about 225 characters for English printing. The size of a font varies according to the work to be done with it. Small fonts contain from 500 to 800 pounds, and large ones have from 20,000 to 50,000 pounds. Type foundries have a rule for determining the number of different letters necessary to make each font complete. Z requires the smallest number. For every *s* there will be 46 *s*'s, 60 *e*'s, 32 *h*'s, 15 *m*'s, and so on.

There are thirteen sizes of type in ordinary use in printing books and newspapers. These are designated by special names and by the number of points they measure, a point being $\frac{1}{24}$ of an inch. Both methods of naming are given in the illustration.

Nonpareil	6-point
Minion	7-point
Brevier	8-point
Bourgeois	9-point
Long Primer	10-point
Small Pica	11-point
Pica	12-point
English	14-point

The smaller sizes are not used in general printing, although sometimes small Bibles are printed from 6 $\frac{1}{2}$ point, or agate, and still smaller sizes are used for marginal references in Bibles and other works. The type used in job printing is of various sizes, to suit the taste and conditions of the advertiser. See **PRINTING**.



A TYPE

TYPE SETTING MACHINES. See
LYNOTYPE; MONOTYPE.

TYPEWRITER, a machine for the rapid transcribing of letters, manuscripts, etc., as a substitute for handwriting. It was first successfully put into operation in 1875, and since that date has made its way into every kind of business house, court of law and governmental department where speed, accuracy and system in correspondence, the making of reports and tabulating of statistics are required. An average typewriter operator writes sixty words a minute, a rate three times that of a good penman, and the characters are much more legible. As women are the best operators of typewriters, the effect has been to bring thousands of them into the business world, where they have found opportunity to advance to responsible secretarial and executive positions.

The essential parts of the typewriter mechanism are a set of types, an arrangement of keys, for bringing the types in contact with the paper; a paper carrier, or carriage; a platen, or roller, against which the types strike, and an inking device. While there are many patterns of typewriters, from the earliest "Remington" to the latest make, full of new devices, all belong to two classes, those known as *basket* machines and those known as *cylinder* machines. In the basket machines, each type is on the end of a bar, hung on a pivot and joined to its respective key by a lever attachment. These type bars are attached to a frame which was formerly circular, forming the basket from which the machine takes its name. In modern machines the frame is an arc of a circle. The bars are of such length that the type on each strikes the platen at the same point. When a key is depressed, the bar strikes the inking ribbon against the paper, making the impression of the character. As the bar drops back to its position, the carriage moves forward one space, thus putting the paper in position for the next letter.

The cylinder machines have the type arranged on a cylinder, and the depression of the key causes the cylinder to revolve to a point which allows the character desired to be pressed upon the paper by a little hammer. The arrangement of keys on all makes of typewriters is practically the same, the so-called universal keyboard is in use with but slight modifications on over ninety per cent of all models.

TYPHOID, ty'foi'd, FEVER, a germ disease caused by the presence of a bacillus which lodges in the intestines, spleen and mesenteric lymph nodes. The multiplication of the bacilli causes ulceration of the intestines, and when the ulcers perforate the intestinal membranes the disease is fatal. Typhoid germs enter the system through the mouth, from whence they find their way to the intestinal tract. Food and drink are the most common vehicles which serve as conveyors of the bacillus, and polluted water and milk are the most common sources of infection. Water containing sewage is a particularly dangerous carrier of bacilli.

Symptoms and Treatment. It requires from eight to fourteen days for the disease to develop after the germs have entered the system. The attack usually comes on slowly, and the patient may continue his regular work for a few days, but ultimately he will have to go to bed. The first symptoms are nausea, headache, pains in the back and limbs and sometimes nosebleed and chills. During the first week the fever rises about one degree a day, until the temperature reaches 103° or 104°. The fever remains stationary the second week; during the third week it should begin to subside, and convalescence should begin the fourth week, unless the case is one of unusual severity. Sometimes the ulcers penetrate the blood vessels of the intestines and cause hemorrhages, which may prove fatal. When the fever begins to decline the patient is in grave danger; he suffers from weakness, tremors of the muscles and possibly delirium, and he may die from weakness.

The treatment for typhoid fever is largely hygienic. The fever is kept down by sponging, and by cold packs and baths. Liquid nourishment, consisting of milk and broths, is given at intervals of about three hours to keep up the patient's strength, and medicines to counteract the effects of the germs are administered. Proper nursing is the most important part of the treatment.

Prevention. Excretions from the bowels and the urine of one affected with typhoid fever contain millions of germs, and all bodily discharges should be disinfected by strong solutions of corrosive sublimate, carbolic acid or chloride of lime. The bedding and clothing should be immersed in boiling water. All dishes, thermometers or other appliances used about the patient should be thoroughly dis-

infected every time they are used. Flies, when they have access to infected substances, gather the germs on their feet and carry them to other households. They are one of the prolific causes of the spread of the disease.

Typhoid is not contagious by the breath or by touch; it is conveyed only by carrying the germs. Vaccination with three hypodermic injections of a special vaccine is considered to render one immune for three years, army surgeons attribute the protection of the allied forces during the World War to this method of prevention. There have been widespread educational campaigns to teach people how to prevent typhoid fever, and as a result of this work there has been a marked decline in the number of cases since the beginning of the present century. The following directions issued by the New York City Department of Health should be observed by every family and community:

Keep yourself in good health. Do not use alcoholic drinks. Keep your home and your body clean. Always wash your hands before eating. Drink only the best milk, if in doubt, boil it. Drink only pure water, if in doubt, boil it. Eat only pure, good food. Fresh-cooked food is safest, heat kills the germs. Avoid salads, raw vegetables and raw oysters, unless you know they come from a clean place. Wash ice when it comes and keep the ice-box clean. Do not put ice in drinking water or on food. Deal only with good, clean food stores. Don't eat at dirty restaurants. Keep files out of your rooms and away from your food. Be careful when you go to the country, be sure of what you eat and do not drink from a strange spring or stream. Never visit where there is a case of typhoid fever. Be careful about friends who have had typhoid fever, they may be carriers. Where there is an outbreak of typhoid fever use only boiled water for drinking, and also boil milk just before it is used. If typhoid fever is in your house or neighborhood, or you are exposed to the disease in any way, or are likely to be, have yourself immunized.

TYPHOON, *ti'foon'*, the name applied to the hurricanes that sweep over the coast of China, and Japan and the neighboring archipelagoes from May to November. The storms are most frequent and disastrous in July, August and September. The typhoons are cyclonic storms, which originate somewhat farther south than Manila and move towards India. See **HURRICANE**.

TYPHUS, *ti'fus*, **FEVER**, known, also, from the place where it occurs, as *hospital fever*, *jail fever* and by other names, is essentially a fever of the poor, ill-fed and badly-housed inhabitants of large cities. It is

infectious, and is carried by both body lice and head lice. A period of from five to twelve days passes after infection, before the first symptoms show themselves. Then the disease comes on suddenly, with a chill, followed by a high fever, sharp rheumatic pains and headache. Generally about the seventh day, a rash, of irregular spots of dusky hue, appears over the chest and back, and this has given to the disease the common name of *spotted fever*. Delirium is almost always present during the second week, and after a marked crisis, followed by a sound sleep, the person awakes with the fever gone. Thereafter recovery is rapid. The disease is often fatal, especially where the best of care is not given the patient.

The treatment consists in keeping the sufferer in a well-ventilated room, and in preventing exhaustion by light, wholesome diet. One of the worst epidemics of typhus fever known in recent times occurred in Serbia in 1914-1915. Several cases were carried to New York by passenger steamers, and during the study of these cases Dr. Plotz discovered the germ which causes the disease.

TYRRE, *ti're*, one of the most celebrated cities of ancient Phoenicia, on the Mediterranean Sea, fifty miles south of Beirut and twenty-four miles southwest of Sidon. From 1200 to 850 B. C., it was a wealthy and magnificent city, the chief commercial center of the world, famous for its dyes and glassware. The original city occupied an island three-fourths of a mile from the mainland. In 332 B. C., when Alexander the Great besieged the city, he built a causeway out to the island, and the sands deposited by the sea upon this structure transformed the island into a peninsula. The modern town, called Sur, has a population of about 6,000.

TYROL, or **TIBOL**, *ti'ol*, before the dissolution of the Austro-Hungarian monarchy in 1918, a crownland of Austria, comprising the greater part of the political district of Tyrol and Vorarlberg. It lies in the heart of the Alpine region, and is noted for the charm and variety of its scenery, which is much like that of Switzerland. After the World War, Italy laid claim to this region, because a portion of the inhabitants are Italians, but the League of Nations awarded part of it to the new republic of Austria, with the capital at Innsbruck. The province of Tyrol has an area of 4,790 square miles and a population of about 300,000.



U, the twenty-first letter and the fifth vowel in the English alphabet. It comes from the Greek alphabet, as the Phoenician had no such character, and it was, until comparatively recent times, used interchangeably with v. In time, v came to be used for the consonant sound and u for the vowel sound, as in the case of j and i. The true primary sound of u was that which it still retains in most of the languages in Europe, that of oo in cool, the sound being sometimes short, sometimes long. The so-called "long u" in English, however, has a distinct y sound prefixed to the oo sound, as in use, abuse.

UDALL, NICHOLAS (1506-1556), the author of *Ralph Roister Doister*, the earliest English comedy. He was master of Eton School from 1534 to 1541, and the play was originally written for performance by the scholars. Udall was in favor at court as a writer of pageants and interludes.

UFFIZI, *oof fee' ze*, a famous palace in Florence, containing one of the most extensive and valuable art collections in the world. This gallery was founded by the Medici family in the fifteenth century, and valuable additions have been made from time to time. In the collection are the statues *Venus de' Medici*, *The Dancing Fawn* and *The Wrestlers*, and the works of great masters, such as Raphael, Michelangelo, Titian, Correggio, Holbein and Rembrandt. The Uffizi also contains the Biblioteca Nazionale, a collection of 300,000 volumes and 14,000 manuscripts. It is connected by covered passageway with the Pitti Palace (which see).

UGANDA, *oo gahn'da*, the administrative division of British East Africa that forms the western part of the colony. It consists of the former native kingdom of Uganda and a number of adjacent states. Its area is 109,119 square miles, practically that of the state of Nevada. Of this area, 16,377 square

miles are water, for within the boundaries lie portions of Victoria Nyanza, Lake Edward, Lake Albert and Lake Rudolph, and all of lakes George, Kioga and Salisbury. The region around Lake Rudolph is low and generally unproductive. The western and southwestern parts of the protectorate consist of rolling country and plateaus, varying in altitude from 2,000 to 4,000 feet, upon which mountain peaks rise to the height of 12,000 to 16,000 feet. Here are some of the most prominent mountains of Africa including the Ruwenzori, whose highest summit, Alexandra, has an altitude of 16,794 feet.

Gold is mined, and there is an abundance of iron throughout the country. Although the natives are quite skilful in working the ore, there is but little mining. With the exception of the Lake Rudolph region, the soil is generally fertile. The climate in the highland region of the southwest is pleasant and inviting, and this part of the protectorate holds great possibilities. Commercially, cotton is the most important crop, and its cultivation is being rapidly extended. Coffee, peanuts and cacao are among the other leading crops. Ivory and hides are exported.

In 1934 there were 3,630,000 inhabitants, and about 3,604,000 of these were natives. The Bantus, who are agriculturists, and the Baganda are the most important tribes. The Baganda, who number about 874,000, are noted for their intelligence. Most of them have embraced Christianity, and they are rapidly adopting the ways of civilization. They build permanent homes, and have done much in constructing roads and in developing the country since it was opened to Europeans. The country has railway, steamboat and telegraph communication.

The protectorate is divided into five provinces for the purpose of local administra-

tion The native tribes maintain their own form of control in all local measures, and some of these governments are very efficient Entebbe is the seat of government and British headquarters, and Mengo is the native capital

Uganda was first visited by Captain Speke in 1862 It was again visited in 1875 by Stanley, who wrote an extended description of the country and its people for his *Through the Dark Continent*

UHLANS, *oo' lahns*, bodies of mounted lancers, chiefly employed in reconnoitering, skirmishing and outpost duty They were of Eastern European origin, and formerly wore a semi-Oriental uniform with flowing sleeves and baggy trousers Later, Uhlans became a part of several western armies In the World War (1914-1919) the term was particularly applied to the Prussian light cavalry troops

UINTA, *u' m' tah*, MOUNTAINS, a mountain range in Northeastern Utah, a part of the Rocky Mountain system, jutting at right angles from the Wasatch range Its highest peaks are Gilbert Peak, 13,687 feet above sea level, Emmons Peak, 13,624 feet, and Wilson Peak, 13,300 feet The Green River gorge cuts across the Uinta range, disclosing the varied strata of the mountains, some of which contain deposits of coal

UKRAINE, *THE*, called also UKRAINTIA, a district in the southwestern part of European Russia, proclaimed an independent republic in November, 1917, at the time of the overthrow of the Kerensky régime by the Bolsheviks The Ukraine is made up of those former Russian provinces inhabited by the Little Russians, or Ruthenians Its estimated area is 174,201 square miles, and the population is about 32,000,000 Kiev is the capital The Ukraine occupies a portion of one of the most fertile districts in Europe, and has been called the "granary of Russia"

Its career since the downfall of the czar has been very troubled The government established in 1917 sent peace delegates to Brest-Litovsk, and a treaty with the Central Powers was signed on February 9, 1918 Germany expected to obtain large supplies of grain from the Ukrainians, but the peasants, who were angered by the methods employed, burned the stores in preference to handing them over to the Germans

After the armistice was signed it was hoped that order might be restored, but the Ukraine shared all the troubles of the other border-

Russian states Its claims to the province of Galicia were disputed by Poland (it was given to Poland), and there was conflict with the Rumanians over Bessarabia (Rumania got it) In addition, the Bolshevik government of Russia proper sent a "red" army into the region to establish soviet rule After months of conflict peace was secured, and the Ukraine became federated with the Soviet government In December, 1922, a treaty was concluded, placing the Ukraine under the Soviet Government See RUSSIA

ULCER, *ul' eer*, an open sore on the skin or any of the mucous membranes, both external and internal The tendency of an ulcer is to eat away the underlying tissues An abscess, on the other hand, usually begins in the tissues and works outward (see ABSCESS) Ulcers may be caused by constitutional disorders or through infection Treatment consists in giving the patient fresh air, proper diet and hygienic surroundings, and providing local treatment for the sore Such treatment must be prescribed by the attending physician Ulcers due to tuberculosis can often be healed by exposure to sunlight

ULTRAMARINE, *ul' trah ma reen'*, a beautiful and durable sky-blue pigment, a color formed of the mineral called lapis lazuli This substance is much valued by painters, on account of the beauty and permanence of its color, both for oil and water painting

ULYSSES, *u' lis' ees*, called by the Greeks ODYSSEUS, one of the most famous of their legendary heroes, an important character in the *Iliad* Rejected by Helen, Ulysses married Penelope and settled down with her to a happy life Shortly after the birth of his son Telemachus, the Trojan War broke out, and Ulysses, in spite of a vow to help Menelaus, was unwilling to leave home and engage in the struggle In order to escape, he feigned madness, but Palamedes visited him and, becoming convinced of his sanity, made use of a stratagem While Ulysses was plowing up the seashore and sowing it with salt, Palamedes placed the boy Telemachus in front of his father's plow, and Ulysses, carefully turning aside his team, unwittingly revealed the fact that his madness was merely feigned

He was compelled to join the expedition and at Troy proved himself one of the bravest of the Greek heroes The chief interest in Ulysses, however, attaches to his adventures while he was returning from Troy Driven

to the country of the Lotus-eaters, he with difficulty broke the spell cast upon his companions and induced them to continue the voyage. Meeting with Polyphemus the Cyclops, he put him to death, thus offending Neptune, who constantly pursued him with his wrath. He was driven upon the island of Circe, he was placed in danger between Scylla and Charybdis, and he was borne, after the death of all of his companions, to the island of the nymph Calypso, where he remained for seven years. Returning at last to Ithaca, after wandering twenty years, he found Penelope in great trouble, but with the aid of Telemachus overcame her annoying suitors and made himself powerful again.

Related Articles. Consult the following titles for additional information:
Calypso Penelope
Circe Polyphemus

UMBELLIFERAE, *um bel i' f' ur ee*, the parsley family of flowering plants, containing about 2,000 species, among which are the familiar garden varieties, carrot, parsnip, celery, anise, parsley, fennel and caraway. The flowers, usually inconspicuous and individual, are arranged in large umbrellalike groups, called umbels. The leaves contain oil and a resinous matter, sometimes of a poisonous character. The umbelliferae are distributed throughout the world, but are most abundant in the north temperate zone.

UMBER, a mineral pigment resembling ochre, yielding a brown paint when raw and a reddish paint when burnt. It is found in many localities in Europe, notably the island of Cyprus, and takes its name from Umbria, Italy, where it was first discovered. There are veins of umber in Illinois, Pennsylvania and several other states.

UMBRELLA BIRD, a black South American bird, related to the crows and remarkable for its handsome drooping crest of blue-black feathers. It lives in the deep woods, depositing its eggs on a platform of sticks in the top of a high tree. Its cries are described as "lowings."

UNALASKA, *oo nah lah's kah*, one of the largest of the Aleutian Islands, about seventy-five miles long and twenty miles wide at its widest point. The chief settlement is Unalaska, or Iliuluk, on the north side of the island. Population, 225, gradually decreasing. See **ALEUTIAN ISLANDS**.

UNCAS, *un' lah's* (?-about 1683), an American Indian chief, born in the Pequot settlement in Connecticut. In 1635 he re-

belled against the head chief of the Pequots and founded a tribe of his own known as the Mohegan. In 1637 he combined with the colonists for the destruction of the Pequots and was given a portion of the conquered territory. His friendly intercourse with the colonists aroused the jealousy of the Narragansetts, who made war upon the Mohegans, and for the next few years Uncas was almost continually defending his territory from invasion. A monument has been erected in Norwich, Conn., in his honor.

UNCTION, or **EXTREME UNCTION**, a sacrament of the Roman Catholic Church, administered to the dying to give them strength and grace physically and spiritually in the hour of death. In this sacrament, the priest, dipping his thumb in the oil, anoints the sick person in the form of the cross upon the eyes, ears, mouth, nose, hands and feet, saying, "Through this Holy Unction and His most tender mercy, may the Lord pardon thee whatever sins thou hast committed by seeing Amen." He repeats the same, adapting it to the part anointed. The oil used in this sacrament must be blessed by the bishop, a ceremony performed each year on Maundy Thursday.

UNDERGROUND RAILROAD, the name applied to a method used by Northern abolitionists before the Civil War in assisting slaves from the South to escape from their masters. Regular routes were laid out, and certain houses at convenient intervals were designated as stations. Fleeing negroes were conducted secretly from one of these points to the next, given rest and food and prepared for the next stage in their journey. The most common routes were through Ohio and Pennsylvania, the goal of each being Canada. Among the prominent promoters of the underground railroad were Gerrit Smith, Theodore Parker and Levi Coffin. It is believed that fully 25,000 negroes were thus given liberty during the quarter century preceding the Civil War, fines inflicted on detection for violation of the Fugitive Slave Law having little effect on the abolitionists. An interesting account of the system occurs in Mrs. Stowe's *Uncle Tom's Cabin*.

UNDERGROUND RAILWAY. See **SUBWAY**.

UNDERWOOD, OSCAR W. (1862-1926), an American statesman, one of the prominent Democrats in Congress of the present

decade. He was born in Louisville, Ky, and was educated in that city and at the University of Virginia. After completing a law course, he was admitted to the bar in 1884 and began practice in Birmingham, Ala. Entering politics, he was elected to Congress and took his seat in the lower house in 1895 as Representative of the Ninth Alabama district. This office he held until 1915. In the special session of Congress called by President Wilson in 1913 to revise the tariff, Underwood, who was chairman of the Ways and Means Committee and majority leader in the House, took a prominent part in framing the tariff law that bears his name (see **TARIFF**). He was elected to the Senate in 1914 and re-elected in 1920.

UNEMPLOYMENT. In all countries, at all times, a certain proportion of laborers—skilled and unskilled—are out of work. The term *unemployment* is applied in economics to this industrial condition. The unemployed may be divided into two general classes—those who are out of work because of conditions beyond their control, and those indolent men who will not work as long as they can obtain a living from others. This article considers only the first class.

Causes of Unemployment. The following are some of the chief causes of unemployment:

1 **Change of Season.** Some occupations depend upon the season, such as those of bricklayers, stonemasons, and others included in the building trades. In cold countries these occupations must cease during the winter.

2 **Fluctuation of Demand.** A number of industries have their dull seasons and their busy seasons. Clothing and millinery are good illustrations of industries of this class.

3 **New Inventions and Discoveries.** The introduction of new machinery and of new processes of manufacture always throw a number of workmen out of employment, temporarily, but men thrown out in this way are usually given employment in some other occupation, if they are willing to make the change.

4 **Change of Location.** Occasionally an industry is removed to a distant locality, and some of the workmen are unable or unwilling to remove to the new location and are left without employment. This condition is frequently brought about by combining firms under one ownership. For economic reasons some of the plants thereafter might be closed.

5 **Congestion of Labor.** Every year thousands of men and women flock to the great cities for the purpose, as they suppose, of bettering their condition. To these other thousands are added by immigration. Usually

there are more laborers in large cities than the regular industries can profitably employ.

6 **Industrial Depression.** During periods of prosperity there is a tendency to produce commodities in excess of the demand for them. In course of time the market becomes overstocked, manufacturers have their capital invested in products that they cannot sell, and production is greatly restricted or entirely suspended. When this occurs, large numbers of workmen are without jobs.

7 **Labor Troubles.** Disagreements between employers and employees over wages and other conditions all too frequently lead to strikes and lockouts, causing large numbers to be thrown out of employment for indefinite periods. In these contests both parties generally lose. See **Labor Organizations, Strike**.

Means of Prevention. From the nature of the problem statistics of unemployment are incomplete, and consequently are of little value. Much time and effort have been expended in trying to solve the problem, yet it is found that the unemployed in the United States include from 5 to 15 per cent of the laboring population. This means that at all times there are several million idle workmen, regardless of economic conditions. The following measures have been taken or suggested to remedy this condition:

1 **Labor Bureaus.** The establishing of labor bureaus, which register applications for positions and calls for workmen, has been found an excellent means of bringing the workman and the employer together. The United States Department of Labor through branch bureaus located in different parts of the country is serving as a general clearing house for the unemployed, and its services are very beneficial. A number of states also have established free employment bureaus. In addition to these there are many private bureaus that operate on a commission basis.

2 **Establishing Labor Conditions.** It is the opinion of those who have devoted much study to this problem that regular publication by responsible authorities, state or national, of the condition of the labor market in great cities might check the influx of laborers to these centers.

3 **Shorter Days.** Some recommend the adopting of a shorter day, so it would require more workmen to keep production up to the standard. However, the results of this experiment everywhere it has been tried have not shown the measure to be effective.

4 **Restraint of Immigration.** A large proportion of immigrants remain in the ports where they land, the balance go to other cities or to mining regions, where there is usually a congestion of labor.

5 **Agricultural Colonies.** With rare exceptions there is a scarcity of labor in the country. Could many of these workmen who are out of employment be induced to remove

to farms, they might become prosperous, but special inducements are necessary to lead them to make this change. States having large areas of vacant land, philanthropic organizations and the United States government are interested in establishing farm colonies.

UNGAVA, *ung gah' va*, formerly a territory of Canada, but united to Quebec in 1912, the year in which so many provincial boundaries in the Dominion were changed. In the same year the province of Quebec formed a new territory under its jurisdiction, called the Territory of New Quebec. In this Ungava was included. It has an area of 351,780 square miles. The population is about 14,300, of these 8,800 are white people, 3,500 are Indians and 2,000 are Eskimos. See **LABRADOR**.

UNGULATES, an order of mammals including the buffalo, camel, cow, deer, elephant, pig, goat, sheep, and related animals, generally characterized by strong molar teeth for the chewing of vegetable food, horny hoofs, which enclose their toes, and, in many cases, by the ability to run with speed. Ungulates are the only animals that have horns. They are important in human economy, furnishing man with food, clothing, working power and means of transportation.

Related Articles Consult the following titles for additional information:

Antelope	Elephant	Ibex
Boar	Giraffe	Pecary
Camel	Goat	Rhinoceros
Cattle	Hippopotamus	Sheep
Deer	Horse	Tapir

U'NICORN, a fabulous animal of Greek and Roman mythology, similar to a horse but having a horn on its forehead. With the horn it forms a part of the British coat of arms.

UNIFORMS, MILITARY AND NAVAL. A uniform is a distinguishing dress worn by members of armies, navies and other organizations. This article treats of military and naval uniforms only. Since the beginning of the present century, the military uniforms of the leading nations have been radically changed. The display dress of former times has been replaced by one designed especially for comfort and service. The change was inaugurated by Great Britain, because at the beginning of the South African War the uniforms of the British soldiers were too heavy for service in a hot country.

The old uniforms were replaced by those of khaki. The color adopted was the same as that of the khaki-colored uniforms used in

India. The cut was loose, the coat had patch pockets and the trousers were tight at the knee. The lower leg was protected by boots, leather leggings, or strips of strong woolen material called *puttees*, which were wound around the leg. This type of uniform proved to be so comfortable and serviceable that it has been practically copied by all the leading nations, each making such modifications in color and minor particulars as would distinguish its uniform from that of other nations. The service uniform of the German army was a greenish-gray, and that of Italy is a brownish-gray. The French, however, still retain the blue and red color scheme of former days.

United States. The service dress of the United States army is of khaki, the cut is similar to that of the British uniform described above. A cap of the same material and color is worn, but when the soldier is in battle this cap is replaced by a metal helmet.

Branch and Lane Badges. Each branch is distinguished by a badge. Members of the general staff wear the United States coat of arms of gold and enamel on a silver star. A shield marks the department of the adjutant-general, and the inspector-general is designated by a crossed sword and fasces with a wreath. A sword and key crossed on a wheel and surmounted by a spread eagle is the badge of the quartermaster-general. Members of the medical staff wear the caduceus, or wand of mercury, engineers are indicated by a metal castle, and members of the signal corps by two crossed signal flags and a torch in gold and silver. The badges for officers are as follows: infantry, two crossed rifles with the number of the regiment above the intersection, for cavalry, two crossed sabers, and for artillery, two crossed guns.

Distinctions in Rank. A brigadier-general is designated by one star on the shoulder straps, and a major-general by two stars. On shoulder knot and shoulder loop the general wears a coat of arms between two stars; lieutenant-general, one large star between two small ones, major-general, two silver stars, brigadier-general, one silver star, colonel, a silver eagle; lieutenant-colonel, a silver leaf, major, a gold leaf, captain, two silver bars; first lieutenant, one silver bar, second lieutenant, one gold bar. The rank of noncommissioned officers is indicated by

chevrons on the coat. All officers, without distinction of rank, wear the letters *U S* in Gothic design on the collar.

Gold chevrons on the lower part of the sleeve of soldiers returning from the World War indicated the length of service abroad, there being one chevron for every six months of service.

The Navy. The uniforms worn in the United States navy may be considered typical of those in other navies, since naval uniforms are similar throughout the world. Three uniforms—dress, undress and service—are furnished to every member of the navy. The dress uniform consists of a double-breasted blue broadcloth coat with a high collar and gilt buttons, blue trousers with a strip of gold lace along the seam, epaulets, hat and sword. The service uniform includes a blue or white blouse, with white braid. Thus or the undress uniform is worn during hot weather and in the tropics.

Officers and cadets wear on the cap a silver shield surmounted by a spread eagle, the design being mounted on two gold anchors crossed. Rank is indicated by special emblems on collar, epaulet and shoulder strap. An admiral wears on the sleeve two strips of two-inch gold lace with a one-inch strip between; a rear-admiral wears a half-inch strip of gold lace above a two-inch strip, captain, four half-inch strips, commander, three strips, lieutenant-commander, two half-inch strips with a quarter-inch strip between; lieutenant, two half-inch strips; lieutenant (junior grade) one half-inch strip with one quarter-inch strip above, ensign, one half-inch strip, cadet, one quarter-inch strip.

UNION, Act of, an act of the British Parliament in 1841 for uniting Upper and Lower Canada. It was the result of the Earl of Durham's famous *Report on the Affairs of British North America*, and was favored at the time by the legislatures of both Upper and Lower Canada. Under the Act of Union, Canada was governed by a legislative council of not more than twenty members, appointed by the Crown, and a legislative assembly in which the provinces had equal representation. It was never entirely satisfactory in its operation, however, and was succeeded, in 1867, by the organization of the *Dominion of Canada*.

UNION OF SOUTH AFRICA, a self-governing state of the British Empire,

widely known for its mineral wealth and consisting of the provinces of the Cape of Good Hope, Natal, Orange Free State and the Transvaal. It was established by an act of Parliament in 1910, and became a member of the British Commonwealth of Nations in 1926. Its area is 472,550 square miles, its population, about 8,000,000, one-fifth white.

Agriculture. The country consists of plateaus and rolling plains, or *veldts*, which are almost treeless and afford excellent pasturage. The climate is temperate, and the soil is fertile. Wherever there is sufficient rainfall excellent crops can be grown, but stock raising is the chief agricultural occupation. Millions of sheep are pastured on the prairies, and wool is the staple of wealth among the farmers. Angora goats and cattle are also raised in large numbers, and ostrich farming has become an important industry. Sugar cane and tea are successfully cultivated in the warmest regions. Wheat and fruits are important products of the Cape Province. It is claimed that the Union of South Africa has such a variety of climate as to admit of the successful cultivation of all crops within its borders.

Mineral Resources. The mines constitute the greatest source of wealth, and the discovery of the vast deposits of gold and rich diamond fields brought the country into universal notice. The principal gold mines are in the Witwatersrand in the Transvaal, and the output of these mines is about \$250,000,000 each year. The most valuable diamond mines are around Kimberley, and the yearly output of diamonds has exceeded \$50,000,000. There are valuable copper mines in Namaqualand, and extensive deposits of coal and iron have been discovered in the Cape Province and Natal. Silver, graphite and manganese occur in paying quantities, and marble and other building stone are found.

Transportation and Communication. The roads are fair in the settled districts, and mail carts and other wagons connect large towns off the railways with these lines of transportation. All the important ports of the south and east coast are connected by railway, and these lines are joined to the Cape-to-Cairo Railway, extending from Cape Town into the interior of the continent. At the end of 1934 there were 13,000 miles of railways in the South African railway system. There were about 36,000 miles of telegraph line, and

the telephone lines carried over 400,000 miles of wire. The country has over 3,200 post-offices and an efficient mail service.

Government. The government is organized on the same plan as the governments of Canada and Australia. The chief executive is the Governor-General, who is appointed by the Crown. He is aided by an Executive Council of his own selection. The Parliament consists of a Senate of forty members (eight appointive and thirty-two elective) and a House of Assembly of 150 members elected by the people. Each province has its local government, consisting of a lieutenant-governor and a legislative assembly. The courts are guided by Dutch law in settling civil suits, and both Dutch and English languages are used. Both of these languages are taught in the schools.

History. The early history of the provinces is given under their respective titles. Before the South African War there was a constant struggle between the Dutch and English settlers. The war gave the English the ascendancy, and the ablest of the Dutch leaders soon joined the English leaders in an effort to establish a permanent government that would be satisfactory to all parties, their efforts resulted in establishing a federated state including the five provinces. Several clashes with the natives have occurred, and soon after the outbreak of the World War the country was threatened with a serious rebellion, but the rebels were defeated.

The Union gave notable assistance to the Allies in that war. British and Union soldiers took German Southwest Africa early in the war, and at its conclusion the Union was given the mandate to govern it.

In 1926 the Union sent delegates to the Imperial Conference in London, that historic meeting which made the six leading colonial outposts of the Empire free members of the British Commonwealth of Nations. Statesmen of the Union were prominent in these deliberations. Efforts to incorporate Rhodesia into the Union were not successful.

Related Articles. Consult the following titles for additional information:
 Cape of Good Hope, Natal
 Province of the Orange Free State
 Cape Town, Pretoria
 Johannesburg, South African War
 Kimberley, Transvaal, The

UNION OF SOVIET SOCIALIST REPUBLICS. See RUSSIA.

UNIT, a single thing regard as an undivided whole. In arithmetic the term is

also used to denote the least whole number, *one* or *unity*, represented by the figure 1. In mathematics and physics, a unit is any known determinate quantity, by which any other quantity of the same kind is measured, as a foot, a second, a degree, a square yard (see **WEIGHTS AND MEASURES**). Below are given the more important special units used in physics.

The *unit of specific gravity*, for solids or liquids, is the specific gravity of one cubic foot of distilled water at 62° F., for air and gases, of one cubic foot of atmospheric air at 62° F. The *unit of heat*, or the *thermal unit*, is the quantity of heat required to raise one pound of pure water from a temperature of 39° F. to a temperature of 40° F., or, in the metric system, the amount of heat required to raise a gram of pure water from a temperature of 3.94° C. to 4.94° C.

In electricity the *unit of quantity* is that quantity of electricity, which, with an electromotive force of one volt, will flow through a resistance of 1,000,000 ohms in one second, it is called a *farad*. The *unit of electric current* is a current of one farad a second. The *unit of physical work* is that amount of work which will produce a velocity of one meter per second in a mass weighing one gram, after acting upon it a second of time. The *dynamic unit* is the unit expressing the quantity of force or the amount of work done, as the *footpound*.

In physical calculations the system of units now in general use is that known as the *C G S System*, based upon the metric system of weights and measures, in which the centimeter is the *unit of length*, the gram is the *unit of mass* and the second the *unit of time*. Consequently, the *unit of area* is the square centimeter, the *unit of volume*, the cubic centimeter; the *unit of velocity*, a velocity of one centimeter per second. The *unit of momentum* is the momentum of a gram moving with a unit velocity.

For definitions of units of measurement in other fields of work, see articles on those units, as **FOOT POUND**, **DOLLAR**.

UNITARIANS, a religious denomination believing in one God, the Father, and not in a Trinity of Father, Son and Holy Spirit. They accept Christ as a divinely appointed teacher, to be followed, but not worshiped, and regard the Bible as an endeavor of the religion of the spirit to express itself in literature. The Unitarians have no creed, their

faith may be summed up in the words of James Freeman Clarke, "the fatherhood of God, the brotherhood of man, the leadership of Jesus, salvation by character and the progress of mankind upward and onward forever" In 1819, Dr Channing of Boston led a movement which turned 150 of the New England churches to Unitarianism See CHANNING, WILLIAM ELLERY

UNITED CHURCH OF CANADA, a union of the Methodist, Congregational, and Presbyterian churches of Canada, effected in 1925. It was brought about partly by decreasing emphasis on doctrinal differences among Protestant bodies, but quite as much by realization of unnecessary expenditure of effort and waste of resources through overlapping of activities Especially in the newer sections of Western Canada had the burden of maintaining denominational unity become heavy, sparsely settled communities weakly supported a number of churches

The movement in the direction of unity began in 1899 By 1912 the Methodists and Congregationalists had expressed themselves favorably, action by the Presbyterian General Assembly was deferred until the end of the World War In 1924 the Canadian Parliament passed the permissive act of union, effective in one year In this act doctrinal points to guide the new Church and rules for organization were set forth in detail

UNITED DAUGHTERS OF THE CONFEDERACY See CONFEDERACY, UNITED DAUGHTERS OF THE

UNITED EMPIRE LOYALISTS, the name given to those British colonists in America who remained loyal to the King, and refused to join the majority who in 1776 declared their independence of Great Britain About 40,000 of these colonists left New England and other colonies to the south and crossed the border into Canada, and made new homes there Many moved to Nova Scotia and Quebec, but most of them settled in New Brunswick and Southern Ontario and were an important element in the creation of these provinces It was said that this great migration "was the saving of British interest in the great region which England still retained in North America"

UNITED KINGDOM, THE, officially THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND, a term formally adopted in 1801 to indicate the political union of England, Ireland, Scotland and Wales When recognition

was given in 1922 to the new status of a large part of Ireland as the Irish Free State, the old official designation was no longer justified by the facts No immediate steps were taken to change the name, but in 1927 the British Parliament decreed that the term thenceforth should be THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND See GREAT BRITAIN

UNITED METHODIST CHURCH, a sect known also as United Methodists, was organized in England in 1907 by religionists who refused to conform to the established Methodist usages Three branches of Methodism joined to form the new Church, namely, the United Methodist Free Churches, the Bible Christians, and the Methodist New Connection This new organization was further augmented in 1932 by union with the Wesleyan Methodists and the Primitive Methodists Thus in England the various Methodist bodies have sought and secured a degree of unity such as the American Methodists achieved a few years later

UNITED STATES COAST GUARD See COAST GUARD

UNITED STATES COURTS See COURTS, subhead *United States Courts*



UNITED STATES OF AMERICA, one of the world's great powers, the oldest of the great republics, although one of the youngest nations It occupies the central part of North America, having Canada for its northern neighbor and Mexico on its southwestern border The tides of the Atlantic wash its eastern shores, the Gulf of Mexico its southern, while the western look out upon the broad Pacific, aptly styled the "American Ocean" The greatest extent from east to west is 3,100 miles, and from north to south 1,700 miles The area of continental United States is 3,026,789 square miles, of which 43,000 square miles are water But to this area the outlying possessions add about 716,700 square miles, making the total area of the territory under control of the United States government 3,743,478 square miles The British Empire and China are larger than the United States, including its outlying possessions, and

Brazil is larger than continental United States. The British Empire and China have each about four times the population of the United States, but Brazil has only about one-fourth as many inhabitants.

Geographic Advantages. Human development has always been influenced by geographic conditions, chief among which are climate, soil and relative location. When these conditions are applied to the United States, it is seen that it is more highly favored geographically than most other nations. The country lies wholly within the north temperate zone, which has been the home of the great civilizations of history; it lies between two great oceans, almost equally distant from the other great land masses of the earth, with which it has easy communication, mountain and valley, hill and plain are so interspersed as to adapt the country as a whole to all lines of industry; while the great interior, with its broad plains, fertile soil and abundant rainfall is the richest agricultural region of the world. Great rivers furnish natural waterways leading far into the interior and affording inexpensive transportation, while thousands of mountain streams turn the wheels of industry. The ease with which railways can be constructed has caused all parts of the country to be bound together with bands of steel, and commodious harbors on the seaboards accommodate ships laden with the products of all climes. These conditions, combined with the energy, intelligence and genius of the American people, have placed the United States in the foremost position among the great nations of the world.

Boundaries and Coastal Features. West of the 95th meridian the northern boundary is formed by the 49th parallel of north latitude until the Pacific coast is reached, then it extends southward to the Strait of Juan de Fuca, thus placing Vancouver Island within the Dominion of Canada. East of the 95th meridian the northern boundary is very irregular. That portion of it between the meridian and Lake Superior is formed by the Rainy and Pigeon rivers. Through the Great Lakes the boundary line follows the deepest channel, which divides Lakes Huron, Erie and Ontario nearly equally between the two nations, but gives the larger part of Lake Superior to the United States. Following Lake Ontario the boundary is formed for a short distance by the St. Lawrence River, then across New York and Vermont by the 45th parallel,

thence it follows the Height of Land in an irregular course to the northeast, until the northerly point of Maine is reached. From there the boundary is completed by the Saint Johns River, a short, arbitrary line and the Saint Croix River. A portion of the southern boundary is formed by the Rio Grande.

The northern boundary affords the finest example in the world of international faith. By mutual agreement between the United States and Great Britain there has never been a fortification erected along its entire length nor has either nation ever placed a warship or even a gunboat on the Great Lakes. The integrity of the boundary has never been violated.

The prominent projections are, on the Atlantic coast, Cape Cod, Cape Hatteras and the peninsula of Florida; on the Gulf coast, Cape San Blas and the delta of the Mississippi, and on the Pacific coast, Cape Mendocino. The important coast waters are, on the Atlantic, Massachusetts Bay, Long Island Sound, Delaware Bay, Chesapeake Bay, Albemarle Sound and Pamlico Sound, on the Gulf, Apalachee Bay and Mobile Bay, and on the Pacific, San Francisco Bay and Puget Sound. The coast line of the entire country, exclusive of the Great Lakes, is 12,101 miles. The Atlantic coast is 6,017 miles, the Gulf, 3,551, and the Pacific, 2,533.

The chief islands on the Atlantic coast are Nantucket, Martha's Vineyard, Long, Manhattan, Staten, Roanoke and Florida Keys, in the Gulf of Mexico, Tortugas, Saint George's, Santa Rosa, the Chandeleur group, Galveston and Padre, on the Pacific, Santa Catalina, the Santa Barbara group and San Juan.

Surface and Drainage

The vast extent of territory embraced within the United States contains a great variety of surface, but this is naturally divided into five regions—the Atlantic Slope, the Appalachian Highlands, the Central Plain, the Rocky Mountain Highlands and the Pacific Slope.

The Atlantic Slope. This region embraces a narrow strip of land extending from the northeastern corner of Maine to Florida. In the northern part it is extremely narrow, and the slope is steep. The irregularity of the coast line produces numerous good harbors, upon which some of the largest cities of the country are located. Chief among these indentations are Boston Bay, New York





RELIEF MAP OF THE UNITED STATES

Bay, Delaware Bay and Chesapeake Bay. South of Long Island the coast region consists of a tract of level land, varying from 75 to 300 miles in width, known as the Atlantic coastal plain. Along the shore and for a short distance inland the surface is low, level and, in many places, marshy. The land then rises gradually until it meets the Piedmont region, or foothills of the Appalachians, which consist of the remains of an old, worn-down mountain system, formed previous to the present Appalachian system. Where the plain joins the Piedmont region, there is a marked elevation, known as the Fall Line because the rivers reaching the Atlantic fall over this uplift, producing numerous rapids and affording excellent water power.

Appalachian Highlands. This region constitutes the eastern continental barrier and extends from the Gulf of Saint Lawrence to within about 300 miles of the Gulf of Mexico. The trend of the mountains is from the northeast to the southwest. The region consists of a low plateau, from 1,500 to 3,000 feet in altitude, upon which are a number of parallel ranges of mountains. The northern part of the plateau is quite broken, and the mountains are disconnected, forming separate ranges or groups, as the Green Mountains, the White Mountains and the Adirondacks. South of this division, however, the plateau is continuous and is surmounted by a number of parallel ranges of low mountains, such as the Blue Ridge, the Alleghenies and others. The highest peaks in these highlands are Mount Washington (6,293 feet), in the White Mountains, and Mount Mitchell (6,711 feet), in the Black Mountains of North Carolina. On their western slope these highlands descend by a series of foothills to the prairie region in the central plain.

Central Plain. This occupies the vast interior of the country, and embraces that portion of the great central plain of North America included within the boundaries of the United States. It is naturally divided into three regions, the great plain, the lake region and the gulf region.

The Great Plain. East of the Mississippi, this plain occupies that portion of the interior between the Ohio River and the lake region. Here it descends from the western foothills of the Appalachians to the broad, level prairies which compose most of the

states bordering on the Mississippi. This stretch of level or slightly rolling land continues westward, until it rises in gradual swells to meet the foothills of the Rocky Mountain highlands, where it attains an elevation of from 3,000 to 6,000 feet. With the exception of the Black Hills in South Dakota and Wyoming, the Ozark Plateau, which extends eastward from the southern boundary of Kansas, crossing Arkansas, the southern part of Missouri and the southern part of Illinois, this level tract of land extends southward into Texas and westward until it joins the Staked Plains in the northwestern part of that state. With the exception of the forests in Northern Minnesota and in the Ozark Region, this entire portion of the country is nearly treeless. Timber is found only along streams and in regions where trees have been planted by settlers. These vast tracts of level, treeless land are generally known as *prairies*. Their deep, rich soil, abundant rainfall and salubrious climate make the prairies the most valuable agricultural region in the world.

Lake Region. The Lake region constitutes that portion of the United States which drains into the Great Lakes, and thence through the Saint Lawrence River into the Atlantic. The Height of Land, forming the southern boundary of this region, is nearly parallel with the southern shores of Lakes Ontario and Erie. It extends across the northern part of Ohio, Indiana and Illinois, thence turns northward, to include the eastern portion of Wisconsin, all of Michigan and the northwestern part of Minnesota. The region within the United States is not large. It is either level or rolling, nowhere having high altitudes and much of it was formerly heavily timbered, but the lumbering interests have greatly reduced the forest area. The most distinctive feature of this region is the presence of the great inland seas, which he wholly or partially within its boundaries.

Gulf Region. The Gulf region includes the lowlands bordering on the Gulf of Mexico and extending inland until they meet the foothills of the Appalachian Highlands. In the valley of the Mississippi, this plain extends northward to the Ohio River, and west of the Mississippi it extends northward to the Ozark Mountains. Along the coast the land is low, level and swampy, but with the exception of that immediately in the vicinity of the Mississippi River, it rises gradually to-

ward the interior, until it reaches a height of 300 to 500 feet. The plain includes all of the southern and southeastern parts of Texas, and in that state it is from 150 to 200 miles in width.

Rocky Mountain Highlands. This region occupies nearly one-third of the area of the country, and consists of a great plateau, upon which rise several ranges of mountains. This plateau reaches its greatest height and width in Colorado and Wyoming. Here it is nearly 1,000 miles wide and from 7,000 to 8,000 feet in altitude. On its eastern slope it rises from the plain in a series of elevations, until the Rocky Mountains, which form its eastern boundary, are reached. These extend entirely across the country and contain numerous peaks, with altitudes of 14,000 feet or more. The western border of the plateau is formed by the Cascade Mountains, in the north, and their southern continuation, the Sierra Nevada. These mountains contain some peaks higher than those found in the Rocky Mountains. Their eastern slope, since they rise from the plateau, is less abrupt than the western, which descends to the valley between them and the low ranges.

Between these mountain barriers, the surface of the great plateau is widely diversified by lesser ranges, extending in various directions. These ranges divide this vast inland region into three well-marked divisions, the Columbia Plateau, in the north, the Great Basin, and the Colorado Plateau. The first occupies the mountain regions of Washington, Oregon and Idaho. The Great Basin includes nearly all Nevada and Utah and a small portion of Oregon and California; it is entirely surrounded by mountains, and its rivers find no outlet, hence it contains a number of salt lakes and marshes, the most noted among which is Great Salt Lake. South of this, and occupying a small part of Nevada, nearly all of Colorado, a part of Utah, most of Arizona and New Mexico and the southern part of California, is the Colorado Plateau, marked by many high peaks and the deep gorges of its streams. Within the Rocky Mountain Highlands are located several of the great national parks.

The Pacific Slope. Between the Sierra Nevada and Cascade mountains and the coast are low parallel ranges, known as the Coast Ranges. West of these is the narrow strip of land bordering upon the ocean. This low land is much narrower than that bordering

upon the Atlantic, but between the mountains are several valleys noted for their fertility. Chief among these are the valleys of the San Joaquin and Sacramento rivers, the region around San Francisco Bay and that around Puget Sound. Farther inland, in the southeastern part of California, is Death Valley, a remarkable depression, 276 feet below sea level.

Rivers. The United States is drained by five river systems—the Lake system, the Atlantic system, the Gulf system, the Pacific system and the Great Basin system. The portion of the country drained by the Lake system is comparatively small, and the streams flowing into it are generally short and of little importance, though the Saint Lawrence River, forming the outlet of this drainage area, is one of the most important streams in North America.

Owing to the position of the Appalachian Highlands, the rivers of the Atlantic system are short and many of them are rapid. However, the largest of these streams enter the ocean by broad estuaries, which afford excellent harbors, and some of them, particularly the Hudson, the Delaware and the Potomac, cut their way through the mountains, forming deep gorges remarkable for their beautiful scenery. The most important of these rivers, in order, beginning at the north, are the Penobscot, the Kennebec, the Merrimac, the Connecticut, the Hudson, the Delaware, the Potomac, the James, the Pedee, the Santee, the Savannah and the Altamaha. Most of these streams afford excellent water power and the banks of the Merrimac and many others are lined with factories.

The rivers of the Gulf system include the Appalachicola, the Alabama, the Pearl, the Sabine, the Trinity, the Brazos, the Colorado of Texas, the Nueces, the Red, the Rio Grande and the Mississippi, which drains by far the largest part of the country.

The rivers of the Pacific system are few, and with the exception of the Columbia, draining the northwestern part of the country, and the Colorado, flowing into the Gulf of California, they are all short and small. Proceeding southward from the Columbia, those worthy of mention are the Klamath, the Sacramento, the San Joaquin and the Salinas. The Colorado, formed far up in Utah, with the Green as a tributary, drains a portion of the plateau between the Rocky and the Sierra Nevada mountains.

This stream is remarkable for the gorges which it has formed in the middle and lower parts of its course

The Great Basin system consists of a number of small streams which flow into Great Salt Lake and a few smaller lakes, or those which lose themselves in salt marshes in the desert. The Humboldt is the only important river that loses itself in the sands.

Lakes. Fully one-half of the area of lakes Superior, Huron, Erie and Ontario belongs to the United States, and all of Lake Michigan is within her boundaries. In addition to these great bodies of water, the northern part of the Appalachian Highlands contains many lakes noted for their clear waters and beautiful scenery. Chief among these is Moosehead, in Maine, Winnepesaukee, in New Hampshire, and Champlain, between Vermont and New York. The northern parts of Michigan, Wisconsin and Minnesota are also studded with lakes, and in the Rocky Mountain region are found numerous lakes, some of which, like Lake Tahoe, are noted for their high altitude, others for their great depth, abundance of fish and beautiful surroundings. The Great Basin has Great Salt Lake and numerous other smaller bodies of salt water.

Scenery. For variety, beauty and grandeur, the scenery of the United States is unequaled by that of any other country. The Appalachian Highlands are noted for their mountain lakes, sparkling streams and deep gorges, through which rivers find their way to the sea. Notable among the last are the Crawford Notch, in the White Mountains, the Palisades of the Hudson, and the Delaware Water Gap. The central plain presents to view vast areas of fertile fields. The expanse of fresh water afforded by the Great Lakes is nowhere equaled and is approached only by the great lakes in the equatorial regions of Africa. The only cataract comparable with Niagara is Victoria Falls, on the Zambesi, while the Shoshone Falls, Yosemite Falls, the Falls of the Yellowstone and many others in the Rocky Mountain region are unsurpassed in beauty. The extent and grandeur of mountain scenery found in the Rocky Mountains exceed that of any other single country, the Royal Gorge, Yosemite Valley and the canyons of the Colorado and Yellowstone are features of unusual interest, and the geysers and hot springs of Yellowstone National Park have

caused that region to be termed the "World's Wonderland."

Climate

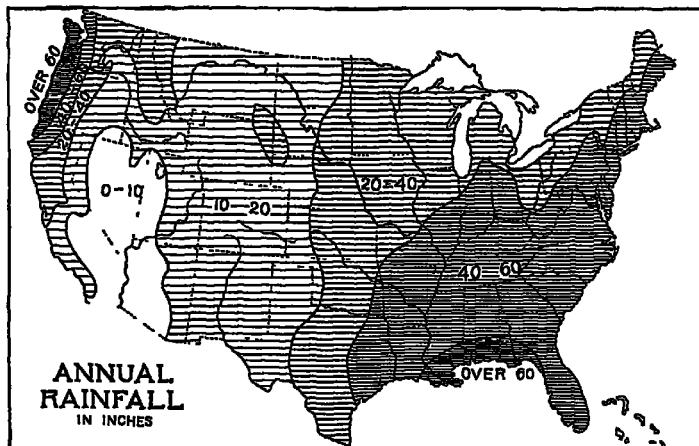
Within the boundaries of the United States may be found every range of temperate climate, and the extreme southern and southwestern sections are semitropical. This great diversity of climate is due to the wide range of latitude (24°), the position and extent of the mountain systems and differences in altitude.

Temperature. On the northern boundary, the average temperature for January is 12° , and for July, 60° . The contrast between the winter temperature on the Pacific and Atlantic coasts in the northern part of the country is very marked, the mean temperature on the Pacific coast being 41° , and on the Atlantic coast, 14° . Toward the south the average temperature rises, and it also becomes more nearly equal at the eastern and western extremities, at the 30th parallel of latitude the difference between the average temperature of the two regions for January is only 2° , and for July, only 8° , while at the extreme southern boundary the January difference is 3° , and the July difference, but 1° . The central plain is open to the passage of air currents with little or no obstruction, consequently alternating north and south winds sweep over this region, causing sudden and marked changes in temperature. The northern part of the Appalachian Highlands has a cool temperate climate. The winters are usually long and severe, and in New England, New York, some parts of Pennsylvania and northern Ohio, there is a heavy fall of snow. Toward the south the mean temperature rises, and south of Pennsylvania little snow falls, except on the highest mountains. Near the Gulf the temperature seldom falls below freezing point, and the Gulf states, with South Carolina and Georgia, verge upon a subtropical climate. The Rocky Mountain region is cooler than other regions in the same latitude, because of its high altitude. The northern part of this region, as well as the northern portion of the central plain, is subject to intensely cold waves during winter, the thermometer occasionally falling as low as 40° below zero, yet, owing to the dryness of the atmosphere, these extremes produce little discomfort. The Pacific coast has a mild climate throughout the year, with a remarkably equable temperature. At sea level the thermometer

seldom falls below freezing point, even in the northwestern part of the country, and during summer it seldom rises above 80° or 85°. In the southern part of California, the temperature in summer may be higher than this, though hot waves, even there, last but a short time.

Rainfall. The position of the mountains causes a very unequal distribution of rain. In general, all that portion of the country

western part of Utah, the western part of Arizona and the southeastern part of California, is practically rainless. This is because the winds are robbed of their moisture as they pass inland from the Sierras. The moisture brought by the winds from the Pacific is precipitated on the western slopes of these mountains. The valleys between them and the coast ranges are well watered, and along the coast through Washington,



east of the 100th meridian, crossing the middle of North and South Dakota and Nebraska, has sufficient rainfall for agriculture. In most of this region the annual precipitation varies from 40 to 60 inches, which is evenly distributed throughout the year, making this region well suited to agriculture.

A small region in the eastern part of North Carolina, and another area north of the Gulf of Mexico, have over 60 inches. The northern half of Illinois, Wisconsin, Minnesota, Iowa, most of Kansas, Missouri, Oklahoma and the eastern half of Texas have from 20 to 40 inches of rain, which assures crops, but west of this region the annual precipitation varies from 10 to 20 inches, and agriculture can be successfully prosecuted only by irrigation. However, large areas are well adapted to grazing, since there is sufficient moisture to produce a good growth of grass. The great plateau between the mountains is arid, and the southern half of it, including nearly all of Nevada, the

Oregon and the northern part of California, there is a region which receives over 60 inches of rain during the year.

Mineral Resources

The minerals of the United States constitute one of its chief sources of wealth, and in extent and variety they exceed those of any other country. With the exception of some coal and petroleum, most of the valuable minerals are found in the mountainous regions, and there the mining industry is most fully developed. The important mineral fuels are coal, petroleum and natural gas, the chief metals are iron, gold, silver, copper, lead, zinc and quicksilver.

Coal. The most extensive coal measures are found in the central part of the Appalachian highlands, including Pennsylvania and West Virginia and extending westward through the southern part of Ohio, Indiana and Illinois. There are also extensive coal measures in Missouri and Iowa, and areas

of lesser extent occur in North Dakota, Montana, Wyoming, Colorado, Utah and New Mexico. There are also valuable coal measures in Alaska. In all, the area of coal measures is about 330,000 square miles. By far the greater portion of this area contains bituminous coal, but the anthracite variety is confined within the boundaries of Pennsylvania. The United States produces more coal than any other country, the output being nearly one-third the world's output, annually as great as 600,000,000 tons.

Petroleum. Petroleum ranks next to coal in importance as a mineral fuel, and the oil industry is becoming one of the gigantic businesses of the country. The chief fields are in Pennsylvania, West Virginia, Ohio, Michigan, Indiana, Kansas, Colorado, Texas, Oklahoma, Arkansas, southern California, and Wyoming. The annual output for the entire country has been as great as 900,000,000 barrels, which exceeds the quantity produced by any other country.

Natural Gas. Natural gas occurs in usable quantities in Pennsylvania, Ohio, Indiana, Kentucky, Oklahoma, Texas, California, and a number of other states. It is of great advantage, since it furnishes the cheapest and most convenient fuel, especially for many manufacturing purposes, such as smelting iron and steel and manufacturing glass. Unfortunately much of this gas has been wasted.

Iron. Iron ranks first in value and importance among the metals produced within the country. The great deposits of ore are in Michigan and Minnesota, around Lake Superior; in eastern New York, in Pennsylvania, in Alabama, and Georgia and in southern Missouri, in the Ozark plateau. Deposits of less importance are quite widely distributed, especially in the Rocky Mountain region. Minnesota and Michigan are the leading states in the production of iron ore, and the great centers of iron manufacture are naturally where iron ore and coal can be most cheaply brought together. These are Pennsylvania, Ohio, Illinois, Indiana and Alabama. The United States now leads all other nations in the production of iron and steel, her average annual output of pig iron being 15 to 40 million tons.

Gold and Silver. All the important gold and silver mines are located in the Rocky Mountain region, throughout which the ores are quite generally distributed. Present

methods of extracting the metals from the ore enable miners to work with profit at quantities of low grade ores that were formerly considered worthless, and this has increased the output of both metals. The annual production of gold, including Alaska, is about \$50,000,000, and this amount is exceeded only by the mines in South Africa. The leading states in the production of gold are Colorado, California, Nevada, Utah, South Dakota, Idaho, Arizona and New Mexico, and these also contain the chief silver mines. In production of silver, the country is surpassed only by Mexico.

Other Metals. The United States produces two-thirds of the world's supply of copper. The most important mines are located in Michigan, on the shore of Lake Superior, in Montana, and in Arizona. Lead is mined in Colorado, Idaho, Illinois, Iowa, Kansas, Missouri, Utah and Wisconsin, and the United States produces more than any other country. Lead and copper ores are frequently found combined with silver ore. Zinc is also found in Illinois, Kansas, Missouri, New Jersey and Wisconsin, the Kansas, Missouri, and Wisconsin mines being the largest producers. Quicksilver is found in California, which produces about all of that substance mined within the country. The United States produces about one-half of the world's supply of aluminum, the reduction works being at Pittsburgh and Niagara Falls.

Building Stones. Limestone is very generally distributed throughout the country and is used for a great many purposes, such as the manufacture of lime and the construction of foundations for buildings and of piers for bridges; the finer varieties, such as those obtained in Indiana, are often used for the exteriors of buildings, or when dressed, for trimmings in buildings constructed of other stone or brick. Granite is found in large quantities in the New England states, particularly Maine, New Hampshire and Vermont; there are also large quarries in Minnesota and other states. This is used extensively for building purposes and for tombstones. Granite is very widely distributed through the mountainous regions, and the Rocky Mountain plateau contains sufficient to supply large demands, whenever transportation facilities will warrant working the quarries. Marble is extensively quarried in Vermont and Georgia, and to some extent it is found in Tennessee and other states. The United



Sugar Cane



Peanut



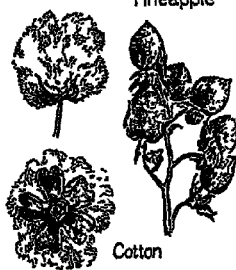
Pineapple



Tobacco



Oats



Cotton



Apple



Potato



Peach



Pear

PLANT LIFE OF THE UNITED STATES

See, also, full-page illustration, Plant Life of North America, in article North America.

States produces more marble than any other country. There are large quarries of slate in Vermont, Pennsylvania and several other states. This stone is used for finishing interiors and for roofing. Clays of suitable quality for the manufacture of brick and tile and for pottery are widely distributed.

Miscellaneous Minerals. Gypsum is found in many localities, and salt is obtained from the waters of salt springs and wells, New York and Michigan being the leading states in its production. The manufacture of salt is an important industry in these states.

Vegetation. The plant life of the United States is characteristic of that of the temperate regions. Originally fully one-third of the country was covered with forests, but in the Appalachian Highlands and the Great Lake region, many sections have been almost wholly denuded, to supply the demand for lumber. In general, the forest areas include the Appalachian Highlands, the region bordering on the south of the Great Lakes and extending westward to the eastern boundary of the valley of the Red River of the North, the region along the Gulf of Mexico, including the eastern third of Texas and most of Arkansas, and the region occupied by the Cascade and Coast ranges of mountains, extending southward from the Dominion boundary as far as the central part of California.

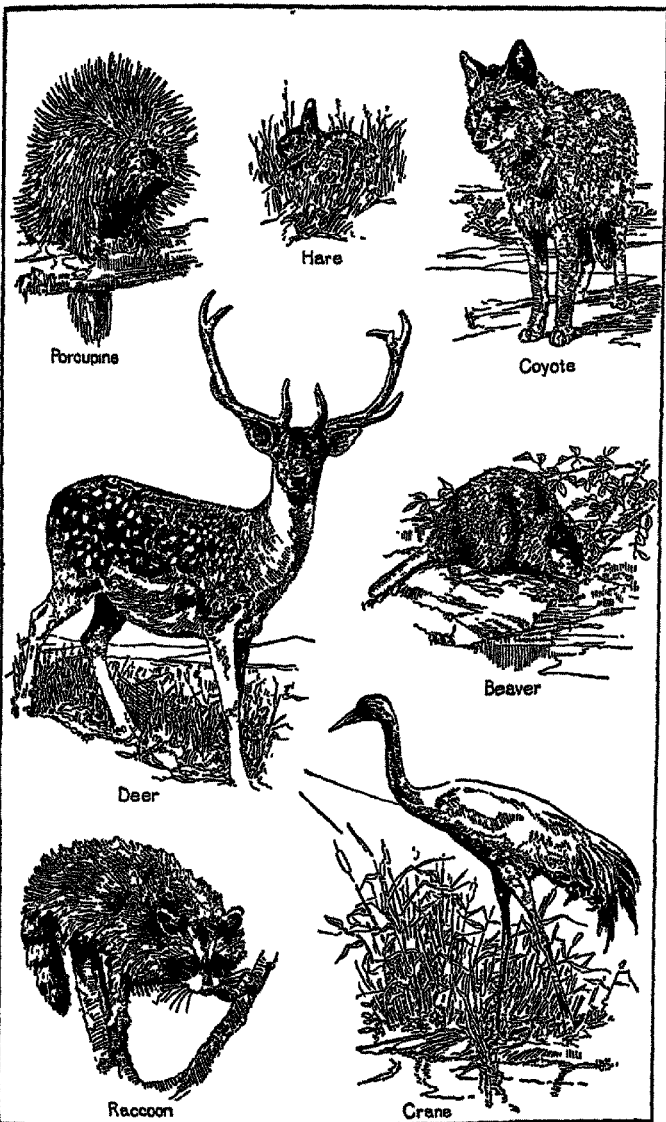
The Appalachian forests are characterized by a great variety of hard wood, such as oak, maple, ash, beech and birch. There are also many cone-bearing trees, including spruce, hemlock and the white pine, in the north, and the yellow pine and the cypress, in the south. The forests in the lake region formerly had a great abundance of white pine, which was interspersed with some hard woods, and those of the Pacific coast are notable for peculiar species of cone-bearing trees, which attain great size, particularly the Douglas fir, the redwood, the yellow cedar and the sequoia.

In addition to its forests the Appalachian Highland region and Atlantic coast plain have a great variety of smaller plants, many of which are useful, while many are desirable only because of their beautiful flowers. Among the latter are the flowering plants of the mint family, a great number of grasses and a number of shrubs. The great central plain is characterized by the growth of herbaceous plants, most of which belong to

the grass family. Many of these grasses are highly nutritious, and previous to the occupation of this region by white men they sustained vast herds of buffalo, which roamed over the prairies. Within the arid region of the Rocky Mountain plateau are found plants peculiar to desert areas. These consist almost wholly of species of sagebrush, bunch grass and buffalo grass, except in the southern portion of the plateau. Here many species of cactus are found, some of them growing to great size. The Pacific slope is characterized by vegetation peculiarly its own, containing a number of species which are tropical or semitropical in nature. Among these are several palms. The southern parts of Texas and Florida have a number of species belonging to the semitropical regions, and the vegetation of Florida very closely resembles that of the West Indies. Two plants discovered in America have become of great economic importance. These are maize, or Indian corn, and tobacco. The cultivated plants are described under their respective titles, and the areas that they occupy are more fully outlined under the subhead *Agriculture*, in the articles treating of the various states.

Animal Life

The native animals of the United States include a large number of species. Among these are 310 species of mammals, 756 species of birds, 816 species of fish, 257 species of reptiles and over 1,000 species of mollusks. Among the larger quadrupeds of the carnivorous order are bears, several varieties of wolf, the puma, or mountain lion, the wildcat, the lynx and the coyote. Among the ruminating animals, various species of deer, the buffalo, the mountain sheep and the pronghorn are the most important. Of these, the buffalo and the mountain sheep are peculiar to North America. Both are now protected in the game preserves of the national parks. There are many species of rodents, of which the beaver is the largest. This animal is also nearly extinct and is found only in the most unfrequented regions of the country. The prairies abound in gophers and prairie dogs, and various species of squirrels frequent nearly all parts of the country. Among the large birds of prey are the eagle, the hawk and various species of owls. The most important water fowl include the Canada goose, the pelican and ducks. Other game birds of



ANIMALS OF THE UNITED STATES

See, also, full-page illustration, Animals of North America, in article North America.

importance are the wild turkey (now nearly extinct), various species of grouse and pigeons. Song birds exist in large numbers and are found in all parts of the country.

Furs and Fish. It was fish that first drew the French to America, and we might say that it was furs that kept them there. Lured by the profits to be derived from buying furs from the Indians, they explored all of Canada as far west as the head of Lake Superior and much of the northern part of the interior of the United States. From those early days to the present, the fur trade has been a source of income to the inhabitants of the forest and mountainous regions of the United States, as well as to those of Canada. So diligently have the hunters pursued the most valuable fur-bearing animals—the beaver, the otter and the fox—that these have nearly disappeared from the land. But the mink, the muskrat and the skunk are still found, and they furnish the greater part of the fur marketed in the United States. Alaska is valuable for its furs, especially the fur of the seal, but the seal fisheries have been greatly restricted by the government, to prevent the extermination of these valuable animals. Fur farms have been established in some of the islands off the Alaskan coast and in Prince Edward Island, and here the valuable silver and black fox are raised in captivity.

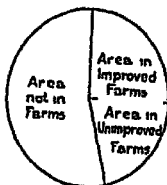
The fisheries of the United States give employment to over 220,000 persons, and the value of the yearly output is about \$125, 000,000. Cod, mackerel, lobsters and oysters are the chief products of the Atlantic coast fisheries, and salmon leads on the Pacific coast. The catch on the Great Lakes includes whitefish, lake trout and sturgeon.

Agriculture

General Survey. For more than a century the United States has been the leading agricultural country of the world, and not one-half of the agricultural resources have been developed. The mountains and large areas of arid land are not suited to the growing of crops, but some of these lands offer good pasturage, and upon them millions of cattle, horses and sheep are raised. In 1910 less than one-half of the land was in farms, and only a little more than one-half of that in farms was under cultivation. In 1934 there were in the country about 518, 267,000 acres of unappropriated and unsurveyed land (see LANDS, PUBLIC). This is an

area more than two times the area of Texas, and much of it will yield the farmer good returns for his investment and labor.

The United States has the largest acreage of cultivated land of any country in the world except possibly, China, for which statistics are not obtainable. The crop acreage of the United States exceeds that of all the great countries of Europe combined, excluding Russia. Of still greater significance is the acreage per capita of population, which in the United States is 35 per person, while in European countries it is from 15 to 1, and in the United Kingdom only 0.4. In other words, there is 84 times as much land per person in crops in the United States as in the United Kingdom, and the improved land per person is much more than this.



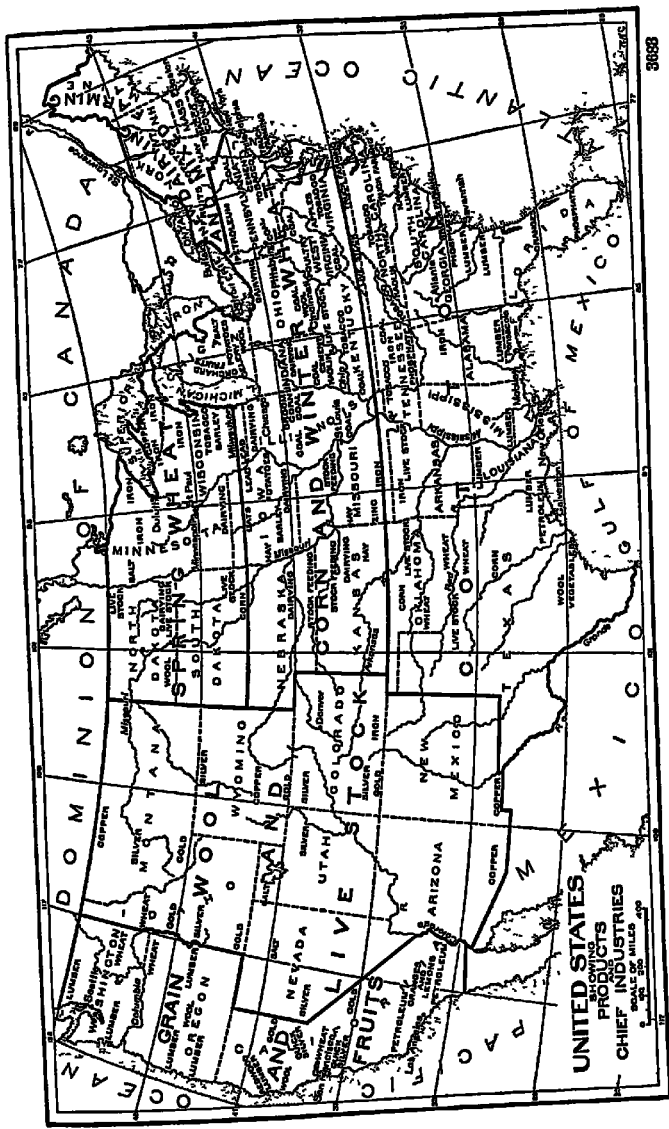
RELATIVE PROPORTIONS OF LAND, IMPROVED AND UNIMPROVED

With reference to the food supply of the United States, the Department of Agriculture at Washington makes the following statement:

The United States is practically independent of the rest of the world in the food supply, except for coffee, tea, sugar, cocoa, bananas and olive oil, and the principal sources of supply of these food products, except tea and olive oil, is found in the western hemisphere.

Of all the cereals except rice, the United States produces more than it consumes. The United States produces and consumes about 70 per cent of the world's corn, over 25 per cent of the world's oats, between 15 and 20 per cent of the world's barley. Of the world's rye, the United States produces only about 2 per cent and of the world's rice less than 1 per cent.

Agricultural Regions. The great agricultural regions are the prairies of the Mississippi Basin, east of the 100th meridian, the land bordering on the Gulf of Mexico, and the valleys of the Pacific slope. The Appalachian region is not so fertile as the others. However, in the valleys and on other low lands there are many valuable farms. In this part of the country the raising of cereals is not profitable, and the region cannot compete with the Mississippi Basin; hence the region is characterized by small farms, whose occupants are engaged in a variety of inter-



UNITED STATES
SHOWING
PRODUCTS
CHIEF INDUSTRIES
SCALE OF MILES
0 50 100

ests The arid region, including the states within the Rocky Mountain plateau and the southern part of California, embraces nearly one-third of the country Over most of this the soil is fertile, and wherever water can be supplied for irrigation, abundant crops are raised The national government has undertaken works of gigantic proportions, for the purpose of reclaiming as much as possible of this region The valleys of the Pacific slope, where well watered, produce abundant crops of all plants which can be raised in that climate.

The product map on page 3683 shows that agriculturally the country is divided into six regions The words in large type indicate the chief crop or industry in each region Those in smaller type indicate other products and industries A careful study of this map will show that the northern New England states and New York are chiefly engaged in mixed farming and dairying, and that each of the other regions is devoted to one or more principal crops or industries, each of which is worthy of special consideration For the development of agriculture in the country, see *AGRICULTURE*, and for more particular accounts, see subhead *Agriculture*, under the articles treating of the different states

Cereals. As a whole, cereals constitute the most important agricultural product of the country The great region devoted to these crops comprises the states of the Mississippi Basin, portions of Pennsylvania and West Virginia, and portions of Oregon, Washington and California. The leading wheat-producing states are Montana, North Dakota, Kansas, Nebraska and Oklahoma More than half the crop is winter wheat The annual crop varies from 750,000,000 to about 850,000,000 bushels, but has reached 932,000,000 bushels The leading corn-producing states are Illinois, Iowa, Missouri, Indiana, Nebraska and Kansas The annual crop varies from about 2,500,000,000 bushels to 3,200,000,000 bushels In 1935 it was 1,400,000,000 bushels The leading states in oats production are Minnesota and Iowa The crop amounts to about 1,200,000,000 bushels yearly. Rice is produced in Louisiana, South Carolina, Texas, Georgia, North Carolina and California The annual crop is about 40,000,000 bushels Considerable buckwheat is grown in some states, and some of the Northern states also produce more or

less rye; but in the production of this grain the United States is far behind some of the European countries.

Cotton and Tobacco. Cotton is the chief product of the Southern states and the one from which they derive the greatest amount of money The annual crop has reached 16,000,000 bales, but averages 10,000,000

The leading states in its production are Texas, Mississippi, Georgia, Alabama, South Carolina and Arkansas Tobacco is also an important crop, and it is generally distributed over the country The amount grown yearly is about 1,200,000,000 pounds The leading states in tobacco production, in the order of their importance, are North Carolina, Kentucky, Virginia, Tennessee, Georgia, Pennsylvania, Wisconsin and South Carolina A number of other states also raise considerable quantities

Fruit. Horticulture is an important branch of agriculture, and the raising of fruit is the leading occupation in Florida, Delaware, parts of New Jersey, the western part of New York and the southern and central parts of California, while its production engages the attention of a large number of farmers in Washington, Oregon, the mountainous part of Montana and a number of other states In Florida pineapples and oranges are the chief fruits In California oranges, lemons, apricots, grapes, prunes and almonds, among the larger fruits, are of greatest importance, while grapes and small fruits are raised in large quantities Grapes and peaches are grown extensively in New York, and apples and peaches are produced in New York, Michigan, Colorado, Missouri and numerous other states Small fruits, including raspberries, blackberries and strawberries, are found in nearly all parts of the country where there is sufficient rainfall for their growth.

Other Crops. In Minnesota, Wisconsin and some other Northern states, considerable flax is grown, mostly for the seed Sugar cane is raised in Louisiana and a few other of the Gulf states, and the sugar beet is grown in many of the states Potatoes are raised in large quantities in Wisconsin, Minnesota and New York Sweet potatoes are grown in Virginia, in the southern part of Illinois and in a number of the Southern states Vegetables are grown for market in Delaware and New Jersey and in nearly all states in which large cities are located New

York and the states on the Pacific slope are noted for their production of hops

Livestock. Much of the arid region is well suited to grazing, and in this section of the country large herds of cattle and sheep are raised. Texas leads in the production of cattle, and Wyoming is first in the production of sheep. Some of the corn states, particularly Iowa and Illinois, are noted for their beef cattle and hogs. New York, the northern New England states, Iowa, Illinois and Wisconsin are extensively engaged in dairyming, and the value of the dairy products is great. The annual production of milk in the United States has amounted to 48 billion quarts a year.

Poultry. The raising of poultry is an important branch of agricultural industry, and it engages many people in all parts of the country, though it has received less attention on the Pacific coast than in other regions. About 700,000,000 fowls are raised annually and 2,000,000,000 eggs are produced. The annual value of the poultry products is about \$1,000,000,000. The leading poultry states are Illinois, Missouri, Iowa, Ohio, Indiana, California, and Texas.

Manufacturing Industries

Causes of Development. During the early period of existence as a nation everything was made by hand, and the clothing and other necessities for the family were produced in the home. The mother was housekeeper, spinner, weaver and tailoress, the father was farmer, carpenter, blacksmith and harnessmaker, and the traveling shoemaker came around once or twice a year and made shoes for the family. Gradually, these industries began to be separated. One family in the settlement made the cloth, one man did the carpenter work and another became a blacksmith. Shops were erected, and where there was water power simple machinery was installed. As the number of settlers increased, factories became more numerous and the distinction between trades more marked. Nevertheless, the growth of the manufacturing industries was slow until about 1860, and since that date, they have developed more rapidly than any other lines of industry. Now the United States is the leading manufacturing country of the world, producing more than one-third of the world's manufactured products.

The chief causes for this rapid development of the United States as a manufactur-

ing nation are the country's abundant agricultural resources, its mineral resources, its extensive forests, the remarkable transportation facilities afforded, the inventive genius of the people and the opportunities for an extensive trade between the states. The extent and variety of agricultural products assure an abundance of food supplies for the people, and the methods of agriculture are such that a comparatively small proportion of the inhabitants can supply food for the entire nation and also for export to foreign lands. This leaves large numbers free to engage in other occupations, and thus enables a larger proportion of the people to engage in manufacturing industries than would be possible were the agricultural conditions such that nearly all were dependent for support upon their own efforts in tilling the soil.

The abundant supply of coal, iron and other useful metals makes the manufacture of many products convenient and comparatively cheap. This is particularly true of iron and steel and their products, while the presence of clay and various forms of building stone is of equal advantage in the construction of factories and other establishments connected directly or indirectly with manufacturing industries. The great forest areas provide an abundance of lumber and timber for all articles made of wood, hence this line of manufactures has been developed on a very large scale.

In addition to the coal for fuel, thousands of streams furnish abundant water power, and the invention of the electric motor has brought into use many power sites so far from manufacturing centers that the location of factories on them formerly was impracticable. Since electric power can be carried distances without great loss, it may operate factories hundreds of miles from its source. The perfection of the gasoline engine has greatly increased the power for propelling machinery. While not adapted to large factories this engine supplies power to many small industries.

The American people have always been noted for their mechanical ingenuity, and they have produced a great number of machines and devices which have greatly influenced, and in some cases have revolutionized, the industries of the world. Chief among these are the cotton gin, the sewing machine, the steamboat, the reaping machine,

the telegraph and the telephone. To these, many others of lesser importance might be added. Their combined effect has been to simplify and cheapen many processes of manufacturing, transportation and communication, all of which have aided in the development of manufacturing industry.

The freedom of commerce between the states is one of the greatest advantages enjoyed by the country. In no other region of the world is there such an extent of country entirely free from tariff barriers. In addition to this, the country embraces localities whose needs differ widely, consequently there is a demand for interchange of products among these sections, and these conditions have combined to build up a domestic commerce much greater than that known in any other country in the world. This has led to the development of various lines of manufactures. No other country has such extensive and numerous transportation lines, both by water and by rail, hence the carrying of commodities from one section to another is comparatively easy and cheap.

Location of Manufacturing Districts The manufacturing districts are very unevenly distributed over the country. In general, those states east of the Mississippi River and north of the Ohio are the leading manufacturing states, and more than four-fifths of all the manufactures in the country are produced within this territory. Without this limit are a few important manufactures, and these are being rapidly developed. Among them are the iron industries of Alabama and Georgia and the cotton industries of Alabama, Georgia, North Carolina and South Carolina. Some of the large cities on the Mississippi are also important manufacturing centers. Chief among these are Saint Louis, Saint Paul and Minneapolis. On the Pacific coast, lumbering, the manufacture of furniture and some other industries are fully developed, while others are increasing in number and importance from year to year.

Leading Industries. Among the many manufactured products of the country the following are the most important: Food products, including flour and meat, iron and steel, textiles, automobiles, lumber and its allied products, leather and its finished products, metals other than iron and steel, with various allied products, and paper. To the manufacture of these commodities should be

added printing and publishing, as another major industry.

Food Products The time was when the farmer carried his wheat to the local mill, brought home the flour, and the wife cooked all the food for the household, but that time has passed, and now much of the food consumed in rural districts as well as the cities is prepared in large establishments. In addition to flour and cured meat, canned goods, breakfast foods, biscuits and numerous other articles are turned out in large quantities of an immense annual value.

The great fruit-growing regions of California, Florida and other States have developed a vast industry in the raising and marketing of citrus and other valuable fruits. Thanks to the development of improved methods of refrigeration in transport, oranges, grapefruit, grapes, and other varieties of succulent fruits are accessible practically everywhere in the country.

Iron and Steel The United States produces more iron and steel than any other country. At the outbreak of the World War (1914) the output of pig iron and steel in the United States was nearly equal to the combined output of Germany, France and Great Britain, the next three largest producers. The leading states in the manufacture of iron and steel products are Pennsylvania, Illinois, Ohio and Indiana. Minnesota and Michigan lead in the production of iron ore.

Textiles New England is the great center for the manufacture of cotton goods, and Massachusetts is the leading state in this industry. Outside of New England, North Carolina, South Carolina, Georgia and Alabama have established extensive cotton mills. In the output of her cotton goods, the United States is second only to Great Britain. Next in importance to the manufacture of cotton goods is the manufacture of woollens, including carpets and hats. Massachusetts, Pennsylvania and Rhode Island are the states in which this industry is principally located, Philadelphia being one of the greatest centers of carpet manufacture in the world. In the manufacture of silk goods the United States is the leading nation, followed by France. The great centers of the industry are in New Jersey and Pennsylvania. Extensive factories for the production of knit goods are also found throughout the New England and North Atlantic states.

Lumber The lumbering industries naturally center in those states containing extensive forest areas. It is now largest in Oregon and Washington.

Leather Pennsylvania ranks first in the tanning and finishing of leather, while Massachusetts is the leading state in the production of boots and shoes. Perhaps in no other industry is the effect of American invention and perfection of organization better seen than in the manufacture of boots and shoes. Owing to the invention of a number of ingenious machines, this industry has been highly organized, and the United States produces more boots and shoes than any other country.

Paper In the manufacture of paper the United States also leads the world. Much of this product is now made from wood pulp, which is generally manufactured in the states that have large supplies of suitable timber for this purpose. The annual output of paper and wood pulp products is about 5,000,000 tons.

Automobiles Although it is one of the youngest industries in the country, the manufacture of automobiles has reached third place among the manufacturing industries. In 1929, the best year of the industry, 5,358,414 automobiles and trucks were made, the value of all automobiles owned in the country was about \$3,000,000,000, and of motor trucks about \$600,000,000. Registrations numbered over 28,500,000.

The leading states in the industry are Michigan, Ohio, Wisconsin and New York.

Other Industries Connecticut leads in the manufacture of small articles, such as needles, pins, buttons, clocks, and various kinds of hardware. The great watch factories of the country are at Waltham, Mass., and Elgin, Ill. The manufacture of electrical apparatus and appliances is extensive and still on the increase. Before the World War the United States depended upon Germany for most of its chemicals and dyestuffs, but the war prevented the exportation of these products from Germany, and this condition stimulated manufacturing chemists to supply the market with American-made goods. The war also caused a great advance in shipbuilding, placing the country second only to Great Britain in this industry. In the manufacture of agricultural implements and machinery the United States surpasses every other nation. This industry is most extensive in

Illinois, Chicago being the leading center. Other states in which it is large are Ohio, New York and Wisconsin. The yearly output is about \$600,000,000. Annual production of clay, glass and stone products is over \$1,000,000,000. Besides these larger industries there are many smaller ones, considered as miscellaneous, whose annual output exceeds \$1,000,000,000 in value, while the hand trades, or those occupations in which the articles are produced by the use of hand tools, have an annual output exceeding \$1,184,000,000.

Transportation and Communication

Waterways The United States has over 12,000 miles of seacoast and more than 18,000 miles of inland waterways. Formerly the inland waterways were of the greatest importance, since by their means the interior of the country found an outlet to the sea. The most important systems of these waterways are those of the Mississippi River and tributaries and the Great Lakes. Since the construction of railways, the river systems have become less valuable, but the completion of canals, by means of which steamers of deep draft can pass from the lakes to the ocean through the Saint Lawrence River has rendered this waterway of great importance. In connection with it, the construction of the Erie Canal, early in the nineteenth century, opened the way for the transportation of commodities between the Atlantic seaboard and the interior. The important canals are described under their titles.

Railroads. The first railroads of importance in the United States were constructed in 1830 and 1832, and at the close of the latter year there were 23 miles of railway in the country. In 1935 the mileage was over 250,000 or more than that of the entire continent of Europe. It is nearly one-third of all the mileage of the world. Naturally the older states contain the larger number of lines, the portion of the country east of the Mississippi River is fully supplied with railways, so that nearly all towns have convenient means of communication. In the Appalachian region, the longest lines extend approximately north and south; west of these mountains the general trend of the railways is east and west; in the Mississippi Valley there are a number of north and south lines, connecting Chicago and Saint

Louis with important commercial ports on the Gulf of Mexico. Some of these lines extend into Mexico.

Six transcontinental lines now extend to the Pacific coast, and the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific, only a short distance north of the international boundary line, also render some service to the inhabitants of the northern part of the country. Electric railways connect many towns situated within a few miles of one another, and these systems are being extended to the rural districts, especially in the eastern part of the country and the southern part of California. On the whole, the country is well supplied with water and rail transportation.

Roads. The development of railways and their importance in the industrial systems of the country has caused neglect of wagon roads, and in the construction of these important means of transportation the United States is far behind European countries. In most states the roads are poor, and in some states, during certain seasons of the year, they are well-nigh impassable.

In 1893 the United States Department of Agriculture inaugurated the Good Roads Movement, and since that time the national government has given some assistance in improving the public highways. In 1914 Congress appropriated \$25,000,000 for the construction and improvement of roads, and in 1918 this amount was increased to \$266,750,000, to be spent within the next three years. This money was divided among the states on condition that each state must appropriate as much money as it received from the national government. Federal cooperation has been continued since on a generous scale, aided by state appropriations.

Air Service. There are about twenty-five companies of major importance engaged in transport service. They operate about 4,500 'planes, and cover nearly 50,000,000 miles a year. Passengers carried now number more than 250,000 yearly, mail carried has reached a total of more than 9,000,000 pounds a year, and express, more than 3,000,000 pounds. Passenger 'planes are increasing in capacity. The continent is spanned between daylight and darkness.

Commerce

Domestic Commerce. The domestic commerce of the United States is larger than that of any other country and far exceeds

its trade with foreign nations. The widely separated sections of the country, differing from one another in climate, soil and products, create a great demand in each section for the products of the others, and in the supplying of this demand an extensive commerce has sprung up. The amount of this trade cannot be obtained, since no record is kept of the shipments of merchandise that are not entered at customhouses; but that it is very great is evident to all who are conversant with commercial systems.

Foreign Commerce. Before 1915, in its foreign commerce the United States was exceeded by Great Britain and Germany and ranked third among the great nations. But the World War created such a demand for American products that it advanced to first place. In 1920 it occupied first place, with imports and exports exceeding 13 billion dollars. This immense total gradually decreased until under normal conditions the totals were between 3 billion and 5 billion dollars. Under normal conditions the exports are divided among various products as follows: Agricultural products, 62 per cent; manufactures, 30 per cent; forest products, 4 per cent, mining products, 3 per cent. The imports have the following apportionment: Raw material, 38 per cent; food and domestic animals, 21 per cent; manufactures, 16.79 per cent; luxuries, 14.47 per cent.

Most of the foreign trade was carried on with the European nations in the following order of importance: The United Kingdom, Germany, France, Netherlands, Belgium. Italy and Russia also have a considerable share. Of Asiatic nations Japan has the first place and China the second. Europe takes about three-fourths of the exports and supplies one-half of the imports. Of the other foreign nations, Canada is the most important in North America, and Brazil, Argentina and Chile lead in South America. The great seaports engaged in European trade are New York, Boston, Philadelphia and Baltimore, while those engaged in trade with China, Japan and the Philippines are San Francisco, Seattle and Tacoma. The Panama Canal has also brought the Atlantic ports much nearer these far-eastern countries.

While American products are found in all countries of the world, the foreign commerce of the United States has until recently been crippled, from the fact that nearly

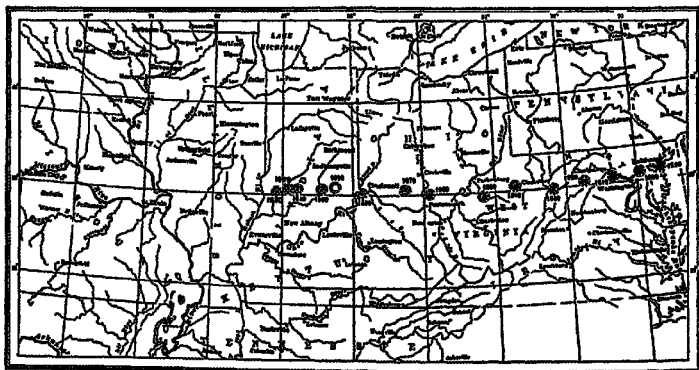
The center moved westward with varying degrees of rapidity, as indicated by the stars on the map printed on this page. The

CENSUS	POPULATION, excluding Alaska etc.	INCREASE	
		NUMBER	PER CENT
1930	122,775,046	17,064,426	16.1
1920	105,710,620	13,738,354	14.9
1910	91,972,266	15,977,691	21.0
1900	75,568,686	12,946,436	20.7
1890	62,622,250	12,466,467	24.9
1880	50,155,722	11,697,412	20.1
1870	38,659,371	7,115,060	22.8
1860	31,443,871	8,251,445	35.6
1850	23,191,876	6,122,423	35.9
1840	17,069,453	4,202,433	32.7
1830	12,666,020	2,227,567	32.5
1820	9,636,453	2,398,573	33.1
1810	7,229,551	1,321,298	36.4
1800	5,305,493	1,379,269	35.1
1790	3,929,214		

center of population has varied slightly from time to time from an east and west line, and during the period in which the states in the Mississippi Valley and farther west were being settled it moved forward more rapidly than it did during the decades between 1900 and 1930. During this latter

Island, with 644.8 people to the square mile, was the most densely populated, Massachusetts, with 528.6, was second, New Jersey had 538, Connecticut, 333, New York, 264, Pennsylvania, 215, Maryland, 164, Ohio, 163, Delaware, 121, Illinois, 136. All other states had fewer than 100 people to the square mile. Wyoming, with 2.3, and Nevada, with 0.8, were the least densely populated. The percentage of increase from 1900 to 1930 is shown in the accompanying map, taken from a *Bulletin* of the Bureau of the Census. By this it will be seen that the movement of population has been to the states west of the Mississippi. The increase from 1920 to 1930 was greatest in California—65.7 per cent. Next was Florida—51.6 per cent, followed by Michigan, with 32 per cent, Arizona 30 per cent, New Jersey 28.1 per cent, Texas 24.9 per cent, North Carolina 23.9 per cent, Oregon 21.8 per cent.

Growth of Cities. Since the organization of the government, the population of cities and towns has increased far more, proportionately, than the population of the country at large, and this proportion has



MOVEMENT OF THE CENTER OF POPULATION

period the center of population advanced westward about 70 miles, being in 1930 about 3 miles northeast of Linton, Ind.

Density. Had the population been evenly distributed over the country, excluding Alaska and Hawaii, in 1930, there would have been forty-one people to the square mile. The average density was 41.3. Rhode

Island, with 644.8 people to the square mile, was the most densely populated. Massachusetts, with 528.6, was second, New Jersey had 538, Connecticut, 333, New York, 264, Pennsylvania, 215, Maryland, 164, Ohio, 163, Delaware, 121, Illinois, 136. All other states had fewer than 100 people to the square mile. Wyoming, with 2.3, and Nevada, with 0.8, were the least densely populated. The percentage of increase from 1900 to 1930 was greatest in California—65.7 per cent. Next was Florida—51.6 per cent, followed by Michigan, with 32 per cent, Arizona 30 per cent, New Jersey 28.1 per cent, Texas 24.9 per cent, North Carolina 23.9 per cent, Oregon 21.8 per cent.

establishment of the factory system, necessitating the bringing together of a large number of operatives, to increased facilities of transportation, to immigration, and to a desire for better schools.

The following table includes the seventy largest cities of the United States. The population statistics are government census returns for 1930.

New York, N Y.	6,330,445
Chicago, Ill	3,375,423
Philadelphia, Pa.	1,950,961
Detroit, Mich	1,558,552
Los Angeles, Calif	1,238,048
Cleveland, Ohio	900,429
St. Louis, Mo	321,980
Baltimore, Md	804,874
Boston, Mass	781,188
Pittsburgh, Pa	659,817
San Francisco, Calif	624,394
Milwaukee, Wis	578,249
Buffalo, N Y	573,076
Washington, D C	486,869
Minneapolis, Minn	464,856
New Orleans, La	458,762
Cincinnati, Ohio	451,160
Newark, N J	442,337
Kansas City, Mo	398,746
Seattle, Wash	365,533
Indianapolis, Ind	364,161
Rochester, N Y	328,132
Jersey City, N J	316,715
Louisville, Ky	307,745
Portland, Oregon	301,815
Houston, Texas	292,352
Toledo, Ohio	290,718
Columbus, Ohio	290,554
Denver, Colorado	287,861
Oakland, Calif	284,083
St Paul, Minn	271,608
Atlanta, Ga	270,368
Dallas, Texas	260,475
Birmingham, Ala	259,678
Alton, Ohio	255,040
Memphis, Tenn	252,143
Providence, R I	252,981
San Antonio, Texas	231,542
Omaha, Nebr	214,006
Syracuse, N Y	209,326
Dayton, Ohio	200,822
Worcester, Mass	195,311
Oklahoma City, Okla	186,389
Richmond, Va	182,929
Youngstown, Ohio	170,002
Grand Rapids, Mich	168,592
Hartford, Conn	164,072
Fort Worth, Tex	163,447
New Haven, Conn	162,655
Flint, Mich	156,492
Nashville, Tenn	153,866
Springfield, Mass	149,900
San Diego, Calif	147,395
Bridgeport, Conn	146,716
Scranton, Pa	143,433
Des Moines, Iowa	142,559
Long Beach, Calif	142,022
Tulsa, Okla	141,255
Salt Lake City, Utah	140,267

Paterson, N J	132,513
Tonkers, N Y	124,646
Norfolk, Va	123,710
Jacksonville, Fla	120,548
Albany, N Y	117,412
Trenton, N J	122,356
Kansas City, Kans	121,557
Chattanooga, Tenn	119,798
Camden, N J	118,700
Erie, Pa	115,967
Spokane, Wash	115,514

Immigration Previous to 1800 no statistics of immigration were kept. Good authorities, however, estimate that at the beginning of the Revolutionary War about one-fifth of the people were immigrants and that from 1790 to 1800 about 5,000 people entered the country each year. During the first half-century following the adoption of the Constitution, immigration was small, and previous to the Civil War, only about 1,000,000 foreigners had settled in the United States. After 1870 immigrants began to come by the thousands, and by 1910 they had added nearly 30,000,000 to the population. Previous to 1895 most of the immigrants were from the northern countries of Europe, the majority coming from the British Isles, Germany, Norway and Sweden. Most of them settled in the new states, in the northern part of the Mississippi Valley, where their descendants now constitute a thrifty, law-abiding and industrious people. After that time, however, the character of immigration almost entirely changed, and by far the larger proportion of immigrants came from Italy and Austria-Hungary, with smaller numbers from other countries of southern Europe. Since 1927 immigrants are admitted only to the number of 150,000 per year.

In 1850 only 9.7 people in 100 among the population were foreign born, while in 1930 the proportion exceeded 12. For the year ending June 30, 1910, 1,041,570 aliens entered the United States, and each year thereafter until 1915 over 1,000,000 immigrants were received each year. Between 1820 and 1914 about 32,000,000 aliens entered the country, exclusive of temporary arrivals, a number equal to almost one-third the entire population. Immigration was greatly reduced during the World War. In 1914, the number of immigrants was 1,218,480; in 1915 it was 326,700, and for 1916 and 1917 the number was less than 300,000, because of the war which was being waged in Europe. In 1917 Congress passed a law restricting

immigration to those who could read at least one language. For a fuller account of this subject, see the article **IMMIGRATION**.

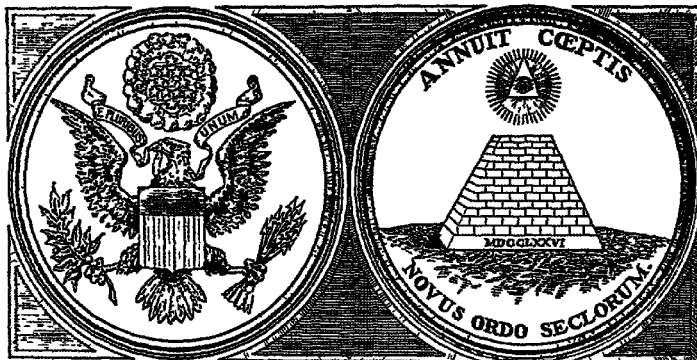
Color. In 1790 the negroes constituted one-fifth of the population and in 1910, less than one-ninth; that is, of the entire population, 9,827,763 were negroes. In 1930 the number had increased to 11,891,000, according to the census of the United States government.

The great majority of negroes are found in the states south of the Ohio River, including Texas and Arkansas, though bordering states contain large numbers. In South Carolina and Mississippi, the negroes outnumber the white population. In 1930 there were also 74,954 Chinese and 138,834 Japanese in the United States. The greater pro-

Germany, Switzerland, Scotland, Holland, France and England. In large cities and in some rural communities immigrants settle in communities and for years maintain their language and many of the customs of the Old World, but in most instances the children educated in the public schools become Americanized.

With very few exceptions, English is the language spoken throughout the country, and everywhere it is the official language of the land. After the United States entered the World War many states prohibited the teaching of any living language, except English in the public schools.

In 1800 the population was 76,303,337, not reckoning the outlying possessions. In 1920 it was 105,710,620. In 1930 the census report



GREAT SEAL OF THE UNITED STATES (SEE PAGE 3241)

portion of oriental immigrants are confined to the Pacific states. There were also in the country 332,397 Indians, most of whom were on reservations. The Indian population is gradually decreasing, as is also the Chinese. The number of Japanese increased more than 25 per cent in ten years, mostly in California and Washington.

Present Character. The population of the United States comprises representatives of nearly every race and nation, and the large cities are probably more cosmopolitan than any others in the world. Because of this characteristic, the percentage of illiteracy in the country is higher than it is in some of the European countries, namely,

for continental United States was 122,775,046, and for the outlying possessions, 14,233,389. The population of each of these possessions is given in the respective articles describing them.

Government

General Features. The national government began with the Continental Congress, which, after the Declaration of Independence, framed the first national constitution, known as the Articles of Confederation. This instrument, however, was soon found to be inadequate to the needs of the country and in 1787 the Constitution, establishing the present government, was framed. As organized under the Constitution, the govern-

ment of the United States is a federal republic, in which the states are self-governing, each having a republican form of government.

The powers of the national government are defined by the Constitution, and all powers not specifically delegated to the United States are reserved to the states and to the people. However, the states are prohibited from the exercise of certain powers, among which are making treaties with foreign nations, declaring war and coining money. There are other powers, also, which they are forbidden to exercise except by permission of the national government.

The national government is organized in three coordinate departments, legislative, executive and judicial.

While these departments, within certain limits, are independent of one another, each is so related to the others as to form, with them, an organic whole. For instance, laws must originate in the legislative department, but the president has the power of veto, and the judicial department can render any law null and void by declaring it unconstitutional. The legislative department also has power to impeach and try United States officers, including the head of the executive department, and the president cannot appoint to certain offices except by the advice and consent of the Senate. The relation of these departments to each other is shown in the diagram accompanying the article CIVIL GOVERNMENT, and the government of each state is described in the article on that state.

Legislative Department. The legislative department consists of a Congress, comprising a House of Representatives and a Senate. The House of Representatives consists of members apportioned among the states according to population, the apportionment being made every ten years. Each state has at least one Representative, whatever its population. The members are chosen at a general election, on the first Tuesday after the first Monday of November, in even-numbered years, and they hold their offices for two years. The apportionment in 1911 was one Representative to every 211,430 inhabitants, and the number of Representatives according to this apportionment was 435. The House of Representatives elects one of its members as the presiding officer, entitled *speaker*, for a term of two years. All bills for raising revenue must originate in this

branch of Congress, but in passing bills, the two houses must agree, and they have equal power to reject measures.

The Senate is composed of two members from each state, formerly chosen by the state legislature, but since the adoption of the Seventeenth Amendment, elected by popular vote for a term of six years. Members are so elected that the terms of one-third of the Senators expire every two years. The presiding officer is the Vice-President of the United States. The Senate has sole power to try cases of impeachment and to ratify treaties with foreign nations.

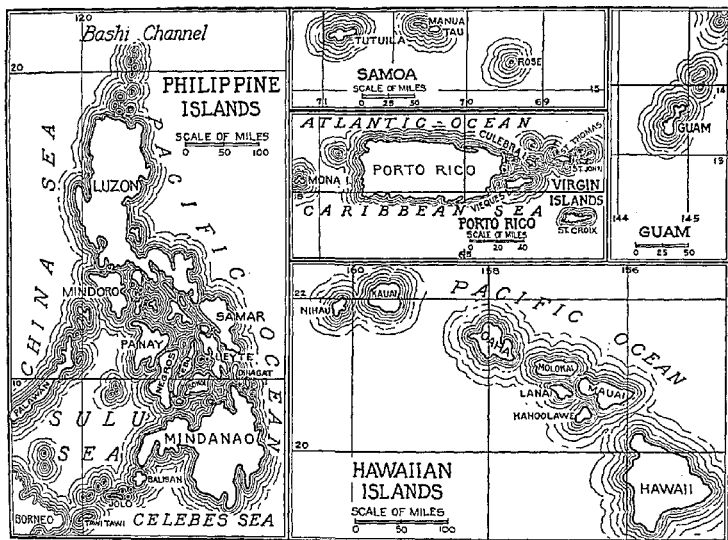
Executive Department. The executive department consists of the President, the Vice-President and such other officers as the President may select or as may be provided for by law. The President and the Vice-President are chosen by electors for a term of four years. In order that this branch of the government might be efficiently administered, Washington established, in 1789, the following departments: State, War and Navy, Treasury and Postoffice. Since then the following departments have been added: Interior, 1849, Justice, 1870, Agriculture, 1889, and Commerce and Labor, 1903, which in 1913 was divided into the Department of Commerce and the Department of Labor. With the exception of the Department of Justice and the Postoffice Department, the officers at the heads of the departments are styled Secretaries. The Attorney-General is the head of the Department of Justice, and the Postmaster-General is at the head of the Postoffice Department. These heads of the department, taken collectively, constitute the President's Cabinet. Each of the departments is explained under its title. The heads of departments and other important officers are appointed by the President, with the advice and consent of the Senate, while many minor officers are appointed by the President without consulting the Senate, or by the heads of departments.

The President is commander in chief of the army and navy, has the power to call Congress in special session, when necessary, and can veto any bill passed by Congress, though such a bill may be passed over his veto by a two-thirds vote of the members of each house. It is the President's duty to send a message to Congress at the beginning of each session, setting forth the condition of the country and recommending such legislation as he

believes is necessary. He also has power to grant reprieves and pardons to persons who are sentenced by United States courts, and it is his duty to see that the laws are executed throughout the country and all of its dependencies.

The Judicial Department. The Judicial Department consists of the Supreme Court and such other courts as may from time to time be established by law. At present the United States courts consist of the Supreme Court, nine Circuit Courts of Appeals, 103

missioners appointed by the United States, and the inhabitants were given an active part in the management of government affairs as rapidly as they became competent. Now both of these possessions have their own legislatures. For a detailed statement, the reader is referred to the subhead *Government* in the articles describing each of these possessions. Alaska and Hawaii are organized territories. The Virgin Islands, acquired by purchase from Denmark in 1917, are under an appointed governor.



POSSESSIONS OF THE UNITED STATES NOT ON THE AMERICAN CONTINENT

District Courts, a Court of Claims, a Court of Private Land Claims, a Court of Appeals for the District of Columbia, the Supreme Court of the District of Columbia, the territorial courts and admiralty courts. The organization and jurisdiction of these courts are described in the article *Courts*.

Outlying Possessions. The acquisition of the Philippine Islands and Porto Rico in 1898 entailed upon the United States a new problem in government. The inhabitants of these islands had never governed themselves, and they were not prepared to assume the responsibilities of government. They were at first governed by a governor-general and com-

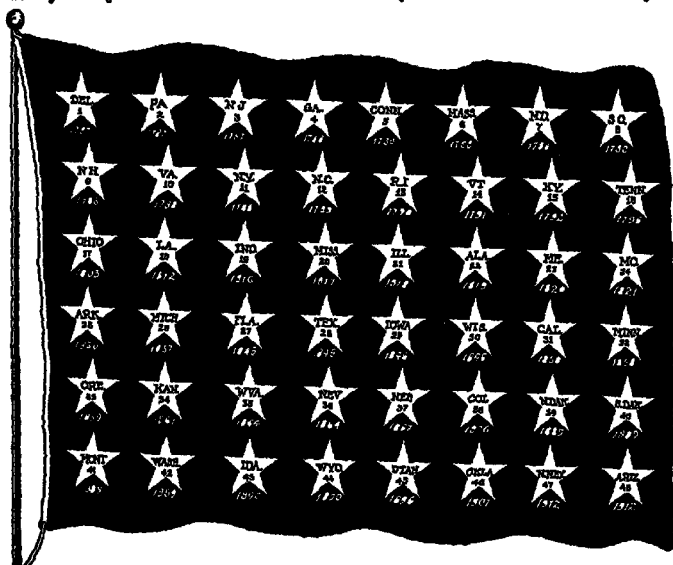
State Governments. The government of each state is based upon a constitution, and in the main follows the plan of the national government. Nearly all states have a legislature of two branches, a Senate and a House of representatives. In many the members of the senate are elected for a longer term than the members of the house, and in some states the terms of only a part of the senators expire at one time, so that one-half of them are chosen at each general election. The executive officers of the state are usually a governor, a lieutenant-governor, a secretary of state, a treasurer, an attorney-general and a superintendent or commissioner

of public instruction. To these some states add an auditor of public accounts and a comptroller.

The state government deals with all affairs pertaining to the interests of the state, such as laws governing marriage and divorce, the obligation of contracts, the settling of estates, the transference of real property and the regulation of loans, interests and mortgages.

In the matter of courts there is a greater divergence of plan. Almost every state has a supreme court, which has a limited original jurisdiction, and to which cases of certain importance may be appealed from the lower courts. Below this are circuit courts, which usually have jurisdiction over several coun-

township officers are chosen at an annual town meeting, in which all voters have a right to participate. All the public business of the local community is in the hands of these town officers. In the county system the township is not recognized, the county being the principal unit of government. The only subdivision is the parish. Under this plan nearly all matters of public interest are looked after by county officers, who are chosen at regular elections. In most states these are known as county commissioners, or county supervisors. Between New England and Virginia a third form of local government grew up. It was the outgrowth of the two systems described above and may be



THE DEVELOPMENT OF THE FLAG

ties, and in some states there are county courts. Almost all the states have county probate courts for the settlement of estates.

Local Government The early colonists established two forms of local government, the township form in New England, and the county form in Virginia and other southern colonies. These shaped the local government in most of the original states. Under the former plan the township is the unit, and the

called the *mixed*, or *township-county*, system. Under this scheme certain minor duties devolve upon township officers, while more important local duties rest with county officers. The officers of the county include commissioners, representing the different towns of the county, an auditor, a register of deeds, a treasurer and a superintendent of schools, or school commissioner. Other officers are sometimes added. This system, on the whole,

STATE	POPULAR NAME	CAPITAL	TOTAL AREA SQUARE MILES	RANK	ADMITTED TO THE UNION	POPULATION CENSUS 1930
Alabama.....	Cotton State.....	Montgomery.....	51,998	28	1819	2,646,248
Arizona.....	Sunset State.....	Phoenix.....	113,956	5	1912	435,573
Arkansas.....	Wonder State.....	Little Rock.....	53,335	26	1836	1,854,482
California.....	Golden State.....	Sacramento.....	158,297	2	1850	5,677,251
Colorado.....	Centennial State.....	Denver.....	103,943	7	1876	1,035,791
Connecticut.....	Nutmeg State.....	Hartford.....	4,965	46	*	1,606,903
Delaware.....	Blue Hen State.....	Dover.....	2,370	47	*	238,380
Florida.....	Peninsula State.....	Tallahassee.....	58,066	21	1845	1,468,211
Georgia.....	Empire State of the South.....	Atlanta.....	59,265	20	*	2,908,506
Idaho.....	Gem of the Mountains.....	Boise.....	83,888	12	1890	445,032
Illinois.....	Prairie State.....	Springfield.....	56,665	23	1818	7,630,654
Indiana.....	Hoosier State.....	Indianapolis.....	36,954	37	1816	3,238,503
Iowa.....	Hawkeye State.....	Des Moines.....	56,147	24	1846	2,470,939
Kansas.....	Sunflower State.....	Topeka.....	82,158	13	1861	1,880,999
Kentucky.....	Blue Grass State.....	Frankfort.....	40,598	36	1792	2,614,589
Louisiana.....	Pelican State.....	Baton Rouge.....	48,500	30	1812	2,101,593
Maine.....	Pine Tree State.....	Augusta.....	33,040	38	1820	797,423
Maryland.....	Old Line State.....	Annapolis.....	12,327	41	*	1,631,526
Massachusetts.....	Old Bay State.....	Boston.....	8,266	44	*	4,249,614
Michigan.....	Wolverine State.....	Lansing.....	57,980	22	1837	4,842,323
Minnesota.....	Gopher State.....	St. Paul.....	84,682	11	1858	2,563,953
Mississippi.....	Bayou State.....	Jackson.....	46,865	31	1817	2,009,821
Missouri.....	Show Me State.....	Jefferson City.....	69,420	18	1821	3,629,367
Montana.....	Treasure State.....	Helena.....	146,997	3	1889	537,606
Nebraska.....	Tree-Planter State.....	Lincoln.....	77,520	15	1867	1,377,993
Nevada.....	Sagebrush State.....	Carson City.....	110,690	6	1864	91,058
New Hampshire.....	Granite State.....	Concord.....	9,341	43	*	465,293
New Jersey.....	Garden State.....	Trenton.....	8,224	45	*	4,041,334
New Mexico.....	Sunshine State.....	Santa Fe.....	122,634	4	1912	423,317
New York.....	Empire State.....	Albany.....	49,204	29	*	12,558,066
North Carolina.....	Old North State.....	Raleigh.....	52,426	27	*	3,170,276
North Dakota.....	Nickertail State.....	Bismarck.....	70,837	16	1889	680,845
Ohio.....	Buckeye State.....	Columbus.....	41,040	35	1803	6,646,697
Oklahoma.....	Sooner State.....	Oklahoma City.....	70,057	17	1908	2,390,040
Oregon.....	Beaver State.....	Salem.....	96,699	9	1859	953,788
Pennsylvania.....	Keystone State.....	Harrisburg.....	45,126	32	*	9,631,350
Rhode Island.....	Little Rhody.....	Providence.....	1,243	48	*	687,497
South Carolina.....	Palmetto State.....	Columbia.....	30,989	39	*	1,738,765
South Dakota.....	Sunshine State.....	Pierre.....	77,615	14	1889	692,849
Tennessee.....	Big Bend State.....	Nashville.....	42,022	34	1796	2,616,556
Texas.....	Lone Star State.....	Austin.....	265,896	1	1845	5,824,715
Utah.....	Deseret State.....	Salt Lake City.....	84,990	10	1890	507,847
Vermont.....	Green Mountain State.....	Montpelier.....	9,564	42	1791	350,611
Virginia.....	Old Dominion.....	Richmond.....	42,427	33	*	2,421,851
Washington.....	Evergreen State.....	Olympia.....	69,127	19	1889	1,563,396
West Virginia.....	Panhandle State.....	Charleston.....	24,170	40	1863	1,729,205
Wisconsin.....	Badger State.....	Madison.....	56,066	25	1848	2,939,006
Wyoming.....	Equality State.....	Cheyenne.....	97,914	8	1890	225,565

*Original State.

is more satisfactory than either of the others, and it has influenced the systems of local government in practically all of the western states. It combines sufficient local interest with an economy in management that is not possible under the old township system.

Territories. As the national domain was settled, territorial forms of government were organized to exercise control over such areas as would best meet the needs of the inhabitants. As the territories became more

densely populated they were subdivided, and the subdivisions were in time admitted into the Union and became states. Under a territorial government the governor and territorial judges are appointed by the President with the advice and consent of the Senate; otherwise the territory administers its local affairs, the same as does a state, electing a legislature which enacts laws to meet the needs of its inhabitants. In 1919 Alaska and Hawaii were territories.

Finance The Constitution gives Congress power to levy and collect direct taxes, duties on imported goods and excise taxes. Direct taxation soon proved to be unpop-

ular, and except in extreme cases, such as war, rebellion and famine, was rarely adopted until 1913, when an income tax law was passed. Most of the government's revenue, however, until 1920 was derived from import duties and excise taxes on spirituous liquors, tobacco and other articles of manufacture, particularly luxuries. In that year the nation lost its liquor revenue for 13 years through the prohibition amendment. In 1917 taxes were levied on many articles not ordinarily taxed, because of the expenses incurred on account of the World War.



AMERICA AT THE TIME OF THE REVOLUTION

The income is ample for the usual needs of the government. Loans are occasionally obtained through the sale of bonds. During the World War five such loans were made, aggregating \$19,100,000,000. Four of them were designated as Liberty Loans, and the fifth as the Victory Loan. All were oversubscribed. United States bonds are usually payable after a long period, and while the interest is low, the permanency of the investment and the perfect security offered

by the government make them very desirable to capitalists.

The most important items of expenditure are pensions, the postoffice, the army, the navy and the interest on the public debt.

Political Divisions. Within the United States proper there are 48 states and 1 federal district. The external possessions consist of the territories of Alaska and Hawaii, Guam, the Philippines, Tutuila, Porto Rico, the Virgin Islands, formerly the Danish West Indies, and a few other small islands. At the adoption of the Constitution there were thirteen organized states, and these are known as the Original States. The first new state admitted was Vermont, in 1791, and the last were New Mexico and Arizona, which came into the Union in 1912. The outlying possessions are described under their titles. The table on page 3696 includes only the states within the United States proper. The figures given are taken from the United States Census of 1930. Arizona and New Mexico, the latest additions to the union of states, elect one Representative each. Each state will be found described under its title.

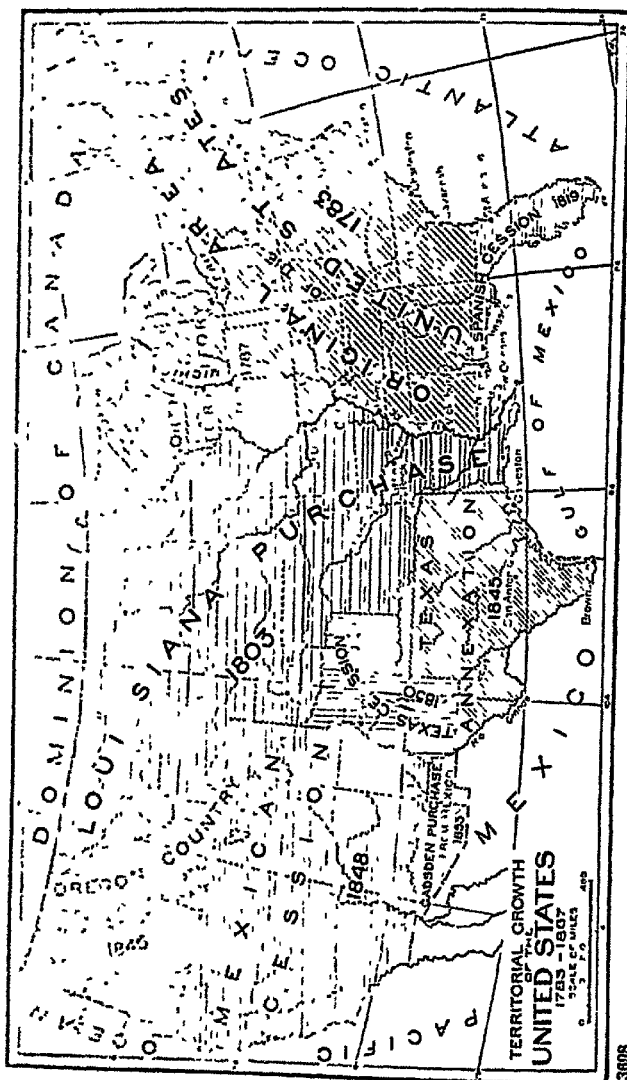
Territorial Expansion

At the organization of the government, the Mississippi River formed the western boundary of the United States, and the



UNITED STATES IN 1800

area of the country was 828,000 square miles. Only about 300,000 square miles, or a little over one-third of this area, was actually settled. In 1803 the first great addition of



territory was made by the purchase of Louisiana. Sixteen years later, this was followed by the acquisition of Florida. With these accessions of territory, the country was openly committed to the policy of expanding her domains, so that in the admission of Texas and the taking over of the territory ceded by Mexico no new policy was established, except in the method pursued. Thus far all territory acquired had been adjoining the United States, but in 1867 Secretary Seward, in the purchase of Alaska, took a radical step, in acquiring territory somewhat remote from the country. A still more radical step was taken in the annexation of Hawaii and the acquisition of the Philippine Islands and Porto Rico. In 1917 the Danish West Indies were purchased and renamed the Virgin Islands. Each of these possessions is described under its title.

The following table contains data concerning the territory added to the United States.

Territorial Division	Year	Area Added (sq. mi.)	Purchase Price
Louisiana	1803	875,025	\$15,000,000
Florida	1819	70,107	5,499,793
Texas	1845	359,793	
Oregon Territory	1846	285,689	
Mexican Cession	1848	822,802	12,250,000*
Golden Purchase	1853	36,211	10,000,000
Alaska	1867	586,884	7,200,000
Hawaiian Islands	1897	6,449	
Porto Rico	1898	3,435	
Guam	1898	210	
Philippine Islands	1898	114,938	20,000,000
Tutuila (Samoa Is.)	1899	77	
Additional Philippines	1901	53	100,000
Panama Canal Strip	1904	474	10,000,000*
Virgin Islands	1917	134	25,000,000
Total		2,906,318	\$102,039,793
Original Territory		827,844	
Total		3,734,162	

*Besides an annual rental of \$250,000.

†This does not include \$10,000,000 paid to Texas for territory outside of its present boundaries, but included in the state at the time of annexation.

Education

The United States has no national system of education, in the sense that there is an educational system administered by the Federal government. However, from the time of the Ordinance of 1787, in which certain sections of land in the Northwest Territory were reserved for educational purposes, the national government has assisted very materially in public education, by granting generous portions of the public domain for the support of universities, agricultural colleges and public schools, and in 1917 liberal appropriations were granted for vocational education below college grade. In addition

to this it maintains the Office of Education, which is a division under the Department of the Interior. The chief officer, called the commissioner of education, collect statistics and publishes a biennial report, containing educational data of national importance. Further than this his duties are advisory only. However, under the able commissioners who have filled the office since the bureau was established, very much has been done to advance the educational interests of the country. The work of the Office is more fully explained in the article *EDUCATION*, *Office of*.

The administration of the public schools is left to the states, and each maintains its own system of public education. However, these systems so closely resemble one another that, taken together, they practically constitute a national system of education. The articles *COMMON SCHOOLS*, *HIGH SCHOOLS*, and those on the important universities of the country will furnish additional information.

Art and Literature

For information on American art see the articles *PAINTING* and *SCULPTURE*. American literature will be found in the article *LITERATURE*, subhead *American Literature*.

History

Discovery and Exploration. At the time of its discovery by Europeans, America was inhabited by savages belonging to the American, or Red, race. The origin and antiquity of these people and the degree of their civilization are still subjects of investigation and dispute. It is also uncertain at what time and place the American continents were first discovered. Norse seamen are said to have visited the North American coast about A. D. 1000, and it is probable that fishermen from Northern Europe had made voyages across the Atlantic before that date. But even if both these facts were true, the credit for the real discovery of America must still be given to those navigators who, at the close of the fifteenth century, crossed the Atlantic and explored the shores of the "New World."

The first of these navigators was Christopher Columbus, who in 1492 discovered the Bahama Islands and on later voyages explored the South and Central American coasts. John and Sebastian Cabot in 1497 and 1498, under the auspices of England, skirted the coast of Labrador and perhaps



THE PURITAN
St Gaudens



FOUNTAIN OF THE GREAT LAKES
Taft



COLUMBUS
Bartlett



TWO NATURES
Barnard



MEMORY
French



ETHAN ALLEN
Mead



DEATH AND THE SCULPTOR French



GEORGE WASHINGTON
Ward

New England, giving Britain the basis for her claim to the continent of North America. About the same time Amerigo Vesputius was exploring the coasts of South America, and in his honor America was named. In 1513 Balboa, a Spanish adventurer, discovered the Pacific, and in the same year Ponce de Leon discovered and explored Florida. Verrazano was the first to represent France in this new field, his voyage being made in 1524. Frenchmen and Spaniards then vied for the control of the new-found riches. Narvaez, Coronado and De Soto, in the south, set out to conquer for Spain the vast interior of the North American continent, while in the north, Cartier, and in Florida, Ribaut and the Huguenots attempted to establish the power of France, but without success.

Meantime, English enterprise had been dormant, but with the advent of Queen Elizabeth to the throne, in 1558, a group of distinguished mariners became anxious to extend English influence in the New World. Of these, Sir John Hawkins, Sir Francis Drake, Sir Humphrey Gilbert and Sir Walter Raleigh were the most important, but they accomplished little of permanent value. It was not till the opening of the seventeenth century that real progress was made toward subduing and colonizing America. At that time, France, under the leadership of such brilliant men as Champlain, Marquette, Joliet and La Salle, extended her influence throughout the region of Canada and into the Mississippi and Ohio valleys, establishing fur-trading posts throughout this territory. In 1565 Spain established a settlement at Saint Augustine, Florida, and made feeble efforts to extend her authority northward, but with little success.

Colonization. A detailed account of the development of each of the colonies, is given in articles upon the several states and also upon the leading discoveries and explorers of the period.

English Colonies. The chief fact in American history during the seventeenth century is the settlement of English colonies along the Atlantic coast. This was begun in 1607 at Jamestown, Virginia, under the auspices of the London Company, a trading and colonizing corporation similar to the East India Company. This colony was in large measure a commercial and political enterprise, and its settlers were drawn from all classes, but especially from the wealthy

and the adventurous. During its early life Jamestown witnessed some of the most important episodes of American history, among them the establishment of the first representative assembly in America (1619), and the institution of negro slavery (1619).

The second English settlement was at Plymouth, Massachusetts, in 1620, and was made by men who had fled from England to avoid religious persecution. In 1628 a settlement was made at Salem by English Puritans. This, too, was a religious movement. The early history of Plymouth and Salem, the latter called Massachusetts Bay Colony, was somewhat troubled. The colonists early manifested a desire for self-government, which led to bitter contests with the king, but at the same time brought about important progress toward political and religious liberty. However, in 1636 Roger Williams was exiled for his religious belief, and in 1661 a bitter persecution of the Quakers began in Boston. Meantime, Harvard College had been founded in 1638, and the first printing press had been set up in 1639.

The success of the early colonies led to other enterprises, and settlements in New Hampshire and Maine resulted. But even the freedom which was nominally established in Massachusetts did not satisfy that community, and in 1633 bodies of settlers from the coast began to travel inland and found settlements along the Connecticut River. These developed into the Colony of Connecticut, which in 1637 adopted the first written constitution in America, known as the "Fundamental Orders of Connecticut." New Haven was settled in this year and was united with Connecticut in 1682. Maryland was organized as a proprietary colony, under the Lords Baltimore, and its first settlement was at Saint Mary's, the original purpose being to found a haven of refuge for English Catholics. The territory of the Carolinas was first settled by Virginians, but in 1663 it was granted to eight English noblemen, who divided it into two colonies, which were again united in 1699, but governed separately after 1729.

Pennsylvania was a Quaker proprietary colony, founded by William Penn, Jr., in 1676 and colonized six years later. Its government was organized on an extremely liberal basis and exerted a powerful influence upon other American colonies. The settlement of Rhode Island was the outgrowth of

the religious persecution in Massachusetts, being founded by two exiles, Roger Williams and Anne Hutchinson, the former settling at Providence, the latter at Portsmouth.

They eventually united their forces. Georgia was the last of the thirteen colonies to be settled, it was founded by James Oglethorpe in 1732, as a refuge for honest debtors. A village was settled at Savannah in the following year.

Other Colonies. New Jersey was first colonized by the Dutch at Fort Nassau, now Gloucester. This was subsequently conquered by the Swedes, restored to the Dutch in 1655 and finally transferred to the English in 1664, becoming a proprietary province under Lord Berkeley and Sir George Carteret. The Dutch were also the first to establish colonies within the territory of New York, by reason of the voyage of Henry Hudson in 1609. Albany was settled in 1623, and New Amsterdam (New York), the same year. The colony was conquered by the English in 1664. Delaware was long a fighting ground between the Dutch and the Swedes, the latter finally being compelled to relinquish their claim, but the English conquered in 1664.

Colonial Development. During the seventeenth century the scattering colonies of all the nations steadily advanced in strength and constantly extended their borders, until the Atlantic coast from Labrador to Mexico was dotted with prosperous villages and trading centers. During the first half of the eighteenth century, the interests of France and England began to come into conflict, as each attempted to extend its dominion over the fertile interior of the continent. This resulted in a series of wars, known, collectively, as the French and Indian wars, extending with but slight interruptions from 1689 to 1763. This long conflict had three great results from the standpoint of the colonies: (1) It practically drove France from America and decided that American institutions should be organized chiefly upon British models, (2) it gave the colonists military experience and a feeling of independent power, which made them more willing to stand firmly for their rights against the mother country, (3) it disclosed the necessity for intercolonial union.

During this same time the colonies were developing politically and were manifesting more and more clearly their determination to govern themselves, at least in all local affairs.

The Development of Union. From the earliest times events in America had shaped themselves to the end that the colonies should become not independent units, but parts of a general system. By the middle of the eighteenth century the necessity of such a result had become more evident, only because in the meantime minor issues of a local nature had been decided, and because recent events, in which all the colonies were united, had disclosed to the colonists their common interests and ideals. This development of the spirit of union culminated in 1754 in a congress, held at Albany for the purpose of framing a treaty of friendship with the Indians, and also of devising a plan for the union of all the colonies. The latter plan, prepared by Franklin, was adopted by the convention, but it was rejected by every colony and by the mother country. The reasons for its rejection disclosed a state of affairs which found its natural conclusion in the Revolutionary War. Says Franklin, "The Assembly did not adopt it, as they all thought there was too much *prerogative* in it, and in England, it was judged to have too much of the *democratic*." Thus the issue was clearly drawn between England and the colonies, the former was set resolutely against the growing spirit of independence and democracy in America; the latter were determined to prevent interference in their affairs.

Revolutionary War. Causes and Beginnings. The fundamental cause of the Revolutionary War had both economic and political phases. It was laid in the theory of colonization held by every important country in the world at that time, namely, that colonies existed for the mother country and that they had no political or commercial rights except those specifically granted to them. This principle probably would not have been contested, if the tendency of all governments, and especially of England, had not been to repress the growing strength of their colonies and thus to cause distressing economic conditions, which the colonists themselves had no power to remedy.

This led to the demand for political self-government, which, when refused, roused a spirit of resistance and, finally, of revolution. This end was hastened by the passage of more and more repressive legislation, such as the enlargement of the Navigation Acts (which see), the establishment of British garrisons in America and the taxation of the colonies to

support these garrisons To enforce the second policy, a stamp tax was inaugurated, which gave to every colonist a grievance and awakened the famous cry, "Taxation without representation is tyranny" The act repealing the Stamp Act was accompanied by a declaration that the Crown had the right to tax the Colonies, and thus it was of little benefit in appeasing the wrath of the Americans When followed by the Townshend Acts the situation became serious and culminated in open violence in Boston, during which British soldiers in Boston killed a number of citizens

It soon became evident to the leading men in the colonies that little was to be expected in the direction of conciliation, and an effort was made to unite the colonies more firmly in opposition to the mother country. One of the important means to this end was the formation of committees of correspondence, which kept the different colonies informed of the march of events throughout the country. The spirit of defiance became more widespread, as was indicated by the destruction of the *Gaspee*, a British man-of-war, stationed near Rhode Island to prevent violation of the customs laws, and by the Boston Tea Party To punish this lawlessness, the British government passed, and attempted to enforce, laws clearly violating the English constitution, and striking at rights especially dear to the colonists. Among these were the Boston Port Bill, closing the port of Boston to all commerce, and acts allowing the trial in England of certain official offenders, permitting the quartering of soldiers upon the colonies and abolishing certain provisions of their charters To enforce these laws, General Gage and a force of soldiers were sent to Massachusetts

The colonies were thoroughly aroused, and in reply to a request of the Massachusetts assembly, they sent delegates to a congress at Philadelphia, September 1, 1774. This body, known as the First Continental Congress, passed resolutions of protest against the British policy and agreed not to import goods from England, then adjourned, to reassemble May 1, 1775 Their petition to Parliament was answered by still more oppressive acts; and before the second Congress met, the American cause had gone beyond the stage of discussion or compromise The colonies, led by Massachusetts, collected military forces and supplies, and when Gen-

eral Gage attempted to seize the stores at Lexington and Concord, and to arrest Samuel Adams and John Hancock, his force was met by a body of minutemen, drawn up on Lexington Common. In the battle which followed the first blood in the Revolutionary War was shed The government of the colonies was soon taken over by the patriots and, guided and inspired by the Second Continental Congress, measures of increasing defiance and independence were taken from time to time (See articles upon the REVOLUTIONARY WAR IN AMERICA and the decisive battles, for brief outlines of the chief military campaigns; see also articles upon the great statesmen and soldiers of the period)

Results of the War At the opening of the struggle the people of the country were not united in the conviction that political independence of Great Britain was the end to be desired They were still loyal to the mother country and were determined to fight to regain their rights as Englishmen But the passage of events and the necessary assumption of the ordinary functions of government by Congress and the provisional governments of the colonies, brought the question of independence prominently forward and finally caused independence to be proclaimed Meanwhile, foreign relations had been established by the appointment of a committee to correspond with foreign governments, and this resulted, in February, 1778, in the signing of a treaty of alliance with France This treaty is generally considered the turning-point of the war, since it led to such active support by France that England was eventually compelled to make peace, the treaty being signed at Paris, September 3, 1783

Articles of Confederation. The financial and internal affairs of the colonies were in a far from satisfactory state The Continental Congress had assumed only the absolutely necessary functions and had no legal power to compel obedience to its decrees. Appreciating the importance of forming a stronger government to replace that which was being destroyed by the Revolution, Congress appointed a committee in the summer of 1776, to draw up articles for the confederation of the thirteen colonies. These articles, though a vast improvement over the organization which had previously existed, left much to be desired, since the same spirit

MASSACHUSETTS



PLYMOUTH ROCK

"What sought they thus afar?
Bright jewels of the mine?
The wealth of seas, the spoils of war?"
They sought - found pure stone."
Quaker

Town - Boston, N. H.

Place - Plymouth

Why do "Honor"?

People - Pilgrims

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

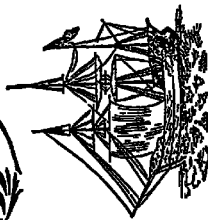
Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church

Churches - Pilgrimage Church



MAYFLOWER



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

BOSTON



HUB OF THE UNIVERSE

which had led the colonists to resist the encroachments of British power led them to fear the establishment of a strong power among themselves. The articles therefore provided for no executive head of the government, leaving all power with Congress, which could pass laws only with the consent of the representatives of nine states, a majority of the representatives of each state being necessary to cast its vote.

In spite of the apparent weakness of the government which was thus created, state jealousies prevented the adoption of the articles until almost the close of the war, in 1781. Meantime, the financial affairs of the government as a whole and of the several colonies had come to a serious state, since all the governments had been compelled to borrow vast sums of money and, besides, had issued paper notes in payment of debts. This paper money, coming from many sources without adequate security, rapidly depreciated in value, until at the close of the war it was practically worthless. The department of war was in a similarly disorganized state.

Adoption of the Constitution. Soon after the adoption of the Articles of Confederation a large faction in the states demanded that a stronger government be immediately organized, but it was several years before they were able to win public sentiment to their view. Finally, in 1786, a convention was proposed by several states, for the purpose of amending the Articles, in order to increase the power of the central government. This convention met in May, 1787, at Philadelphia, and contained in its membership the most able and distinguished statesmen in America, including George Washington, Alexander Hamilton, James Madison, Gouverneur Morris, Robert Morris, Roger Sherman and others. Its sessions were turbulent, owing to the presence of a strong minority party, who feared the centralization of authority, and it was only through compromise that the Constitution was finally produced and accepted. In its completed form it did not satisfy either party, and the discussion which had taken place in the convention was carried before the people in the contest for ratification. Through the efforts of Jay, Hamilton, Madison, Henry Lee, George Washington and others, it was finally adopted, however, being recognized as the most satisfactory constitution which could at that time be made.

Before its final adjournment, the old Congress of the Confederation performed its most notable work, in passing the famous Ordinance of 1787, for the government of the Northwest Territory.

Organization of the National Government. After the ratification of the Constitution by nine states, Congress proceeded to plan for the organization of the new government. The election, held in January, 1789, resulted in the unanimous choice of George Washington for President; John Adams, having the next highest number of votes, was made Vice-President. The inauguration of the government was delayed until April 30, 1789. Washington took the oath of office at New York, where the first national Congress was assembled.

This body already showed a tendency toward division. The Federalists, that is, those who had advocated the ratification of the Constitution, were opposed by the old Anti-Federalists, now styling themselves Democratic-Republicans, or Republicans, who desired the strict interpretation of the Constitution and a tendency toward decentralization of power. Washington chose for his advisers representatives of both of these factions, Hamilton being the acknowledged leader of the former, and Jefferson, of the latter. Hamilton became Secretary of the Treasury, and the first important action of the new government was the carrying into effect of principles suggested by him for the management of the finances of the country. These included the inauguration of the tariff duties; the establishment of a national bank, the assumption of debts contracted by the states during the Revolution; the institution of the excise tax, the establishment of a national mint, and a system of coinage. All of these measures aroused the greatest opposition, but all were passed, and all soon proved their value and efficacy. Washington set himself to organize the executive departments of the government, and he established precedents which have ever since been followed. During his first term, also, the judicial system was organized, and the first ten amendments to the Federal Constitution were adopted.

In spite of his opposition, Washington was nominated and reelected unanimously in 1793. Adams was also reelected Vice-President, but was opposed by George Clinton of New York, a Republican. The most important matter connected with Washington's

second administration was the relation of the government to foreign nations, especially England and France. The Federalists sympathized with England, and the Republicans sympathized with France, in the war which had begun between them. The visit of Citizen Genet, Washington's refusal to recognize him and the later proclamation of neutrality, together with the signing of the very unsatisfactory treaty with England, known as the Jay Treaty, and the refusal of England to evacuate its posts in the Northwest Territory or to grant privileges to American commerce, all led to serious domestic disturbances and almost to war, but such an event was averted by Washington's tact and frankness. His second administration was also important for the suppression of the first rebellion against the government, the Whisky Insurrection in Pennsylvania, for the unsuccessful expedition of Saint Clair against the Indians and the successful expedition of General Wayne, resulting in the cession of a large tract of land by the Indians to the United States. A treaty was negotiated with Spain, by which the United States secured the free navigation of the Mississippi. In 1793 Eli Whitney invented the cotton gin, which was to be of greater political importance during the next century than any other single invention of history.

Washington positively refused to accept a third term as President, delivered a famous farewell address and retired to Mount Vernon. He was succeeded by John Adams, a Federalist, who received 71 votes, in opposition to Thomas Jefferson, a Republican, who received but 68. Adams' administration was at first highly popular, on account of the firm stand which it took against the insolent actions of France, but the passage in 1798 of the Alien and Sedition acts not only forfeited the popularity of the party, but led to its overthrow. The famous Kentucky and Virginia resolutions were passed at this time in relation to these laws. The seat of government was changed in 1800 from Philadelphia to Washington. Doubtless the most important appointment of Adams' administration was that of John Marshall to be Chief Justice of the United States Supreme Court.

At the election in 1800, Adams was defeated, but the two Republican candidates, Jefferson and Burr, had an equal number of electoral votes. The House of Representatives elected Jefferson after a long contest.

Supremacy of the Anti-Federalists The ascendancy of the Anti-Federalists marks an important change in American politics. At the close of the Revolutionary War there was a notable reaction from the extreme ideas of liberty which that struggle had expressed, and the Constitution placed far more power in the central government than pleased many of the more radical Democrats in the country. But after Adams' administration, another reaction set in, away from centralization, toward democracy. In spite of his theories of strict construction, Jefferson soon was compelled to take steps involving broader powers than either of his Federalist predecessors had assumed. First was the purchase of Louisiana in 1803, the constitutionality of which even he himself doubted. On the other hand, he attempted to reduce the importance of the national government by making but small appropriations for the army and navy, but he was compelled to abandon even this policy when a war with the Barbary powers broke out in 1801. During his first term the Twelfth Amendment to the Constitution was passed, changing the method of voting for President and Vice-President.

Jefferson was reelected in 1804, with George Clinton of New York as Vice-President. The most important problem which confronted him during his second administration was the relation of the United States to the commercial war between France and England. He attempted to establish in law his theory that the United States could compel Europe to consider its rights by shutting American ports to the commerce of European nations. This was the cause of the Embargo Act of December, 1807, forbidding American vessels to leave for foreign ports (see EMBARGO). However, this measure did not accomplish its intended purpose, but instead it seriously injured American commerce. The relations between the United States and Great Britain became more and more strained, because of the persistent attempts of British vessels to impress seamen from American ships. This resulted in several small battles. During Jefferson's administration, also, Aaron Burr attempted to separate the western states from the Union, Lewis and Clark made their famous expedition to the Pacific coast (see LEWIS AND CLARK EXPEDITION), the Cumberland Road was authorized and begun; West Point Military Academy was established; Fulton succeeded in constructing the

first successful steamboat, and the slave trade was abolished after 1808.

Jefferson declined a third election and was succeeded by his Secretary of State, James Madison, who defeated Charles C. Pinckney. The Embargo Act was replaced by the Non-Intercourse Act, before Madison's inauguration, but this did not relieve matters greatly. Madison attempted to carry out Jefferson's policy, but was finally compelled to take more stern measures, and the War of 1812 resulted. Meantime, Madison was reelected, with Elbridge Gerry as Vice-President, defeating De Witt Clinton. The war was vigorously opposed by the Federalists, especially of New England, and they held a convention at Hartford, in December, 1814, which, it was rumored, threatened secession, but this movement did not gain sufficient strength to be a serious menace to the country. The treaty of peace was signed at Ghent, December 24, 1814.

The end of the war marked, also, the practical end of the Federalist party as an organization, for its unpatriotic stand during the war had won for it the derision of people in all parts of the country. However, the Anti-Federalist party had meantime so changed its position upon constitutional questions that many of the Federalist principles were already firmly incorporated in the government. During Madison's term, laws were passed granting a second charter to the United States Bank, establishing a protective tariff and appropriating large sums for internal improvements, all measures which the Anti-Federalists had formerly opposed. The Supreme Court, under Marshall's leadership, had also taken firm ground in favor of a strong national government.

The Era of Good Feeling In 1816 James Monroe of Virginia, Madison's Secretary of State, was elected President, receiving the votes of all the states except Massachusetts, Connecticut and Delaware, which were cast for Rufus King of New York. Since the downfall of the Federalist party had removed many questions from controversy, Monroe's administrations are sometimes known as the "Era of Good Feeling," but, in fact, just as sincere debate was carried on during this time as at any time before or after, the main questions being the tariff and the admission of Missouri, the latter of which involved the discussion of the rising issue of slavery. Monroe was reelected in 1820, receiving all the elec-

toral votes but one, which was cast for John Quincy Adams. The most important incident of his second administration was the promulgation of the Monroe Doctrine. In 1824 a higher protective tariff was passed. The election of 1824 turned upon personal questions and resulted in a contest between Andrew Jackson, John Quincy Adams, William H. Crawford and Henry Clay, the House of Representatives finally electing John Quincy Adams.

Rise of the Whigs This election marks another change in the political history of the United States. The Republican, or Democratic-Republican, party at this time took the name of Democratic, which it has since retained, and the Clay and Adams factions, consisting of the loose constructionists of the old party, took the name of National Republican, which eventually was changed to Whig. Adams' administration was marked by a long controversy between his followers and those of Jackson, who claimed that they had been deprived of the election by a corrupt compact between Adams and Clay. This helped to defeat the Adams faction in 1828 and to elect Jackson. The most important event of this period was the passage of the Tariff of Abominations of 1828, which led to the nullification controversy in the following administration. Adams' term also saw the extension of the policy of internal improvements at the expense of the national government, and the beginning of a vast immigration into the West.

Democracy Again in Power. Jackson was elected in 1828 by a vote of 178 to 83, with John C. Calhoun as Vice-President. This election marks the return of the radical Democratic party to power. The chief contests of Jackson's term were over the United States Bank and the tariff, the former being refused a continuance of its charter and the latter resulting in the nullification episode, which was firmly handled by President Jackson, secession being prevented by a compromise bill introduced by Henry Clay. During this controversy the famous debate between Daniel Webster and Robert Y. Hayne occurred. Jackson was reelected in 1832 over Henry Clay, John Floyd and William Wirt, and Martin Van Buren was chosen Vice-President. His second administration was marked by Indian disturbances, in the South with the Cherokee and Seminole, and in the West with the Sacs and Foxes under Black Hawk.

The Senate took firm ground against the President, especially for his attitude toward the national bank, and this contest was bitter throughout his term. The question of the independence or annexation of Texas also arose during Jackson's second term and emphasized the increasing importance of the slavery controversy, the Texas question resolving itself into a contest upon the part of the South for the extension of slavery territory, and resistance to this policy by the North. The first anti-slavery societies date from this time. President Jackson's terms were also notable for the first important contest over the spoils system, which he had introduced into the national government.

Jackson was succeeded by his follower, Martin Van Buren, who defeated the Whig candidate, William Henry Harrison of Indiana. Richard M. Johnson was elected Vice-President. The first year of Van Buren's term was marked by a terrible financial panic, which caused the failure of many banks and corporations and produced great suffering among the people. Van Buren continued the hostility of the Democratic party to the establishment of a national bank and replaced that institution by a system known as the independent treasury. Van Buren's plan, with modifications, has continued to the present.

A Whig Triumph. The financial depression and other issues led to the election of the popular Whig candidate, William Henry Harrison, in 1840, after a memorable campaign, known to history as the "log cabin and hard cider campaign." The anti-slavery party at this election for the first time nominated independent candidates, James G. Burney being the candidate of the Liberty party. Harrison died shortly after his inauguration, and was succeeded by John Tyler, formerly a Democrat. He immediately came into conflict with Congress over the proposed reestablishment of the national bank, and he vetoed two bills drawn to that end. The controversy became so heated that all of Tyler's Cabinet except Webster resigned, he remaining merely to complete the negotiation of the famous Webster-Ashburton Treaty, which fixed the northeastern boundary between the United States and Canada.

In 1843 President Tyler arranged a treaty with the Republic of Texas, providing for the future annexation of that country to the United States, but it was rejected by the Senate. The Texas question became the

leading issue in the following campaign, however, which resulted in the election of James K. Polk, the Democratic candidate, over Henry Clay, the Whig, and James G. Burney, the candidate of the Liberty party. Before Tyler left office Congress had approved a resolution for the annexation of Texas.

Texas and the Mexican War. The administration of President Polk was chiefly notable for the precipitation of the Mexican War, as a result of his order to the United States troops under General Taylor to take possession of territory claimed by both Texas and Mexico. Texas was admitted as a state in June, 1845. The war resulted in an easy victory for the United States and by the treaty of Guadalupe Hidalgo the United States territory was greatly extended. The war is described in the article **MEXICAN WAR**.

The dispute over the territory of Oregon was also an issue in the campaign in 1844 and was settled by a treaty with England in 1846. During Polk's administration, the Walker tariff of 1846 was passed, it was a return to the principle of tariff for revenue only. The independent treasury was also firmly established. The slavery question again cropped out over the extension of the institution to the territory acquired from Mexico and in the formation of the Free-Soil party. Gold was discovered in California in 1848 and resulted in a vast immigration to that region.

The Liberty party had been fused with the Free-Soil party, and in 1848 it nominated Martin Van Buren as its candidate for President, against Lewis Cass, the Democratic nominee, and General Zachary Taylor, the Whig nominee. Taylor was elected, with Millard Fillmore as Vice-President.

Downfall of the Whigs. In spite of its triumph at this election, the Whig party soon showed signs of disintegration, being absorbed in part by the Free-Soil movement, which later took form in the Republican party. Meantime, the Democratic party came under the control of its pro-slavery faction, and the slavery issue was therefore brought to a crisis. For a time in 1850 the controversy seemed to be allayed through the compromise measures, which admitted California as a free state, but gave the South numerous concessions, in the form of the Fugitive Slave Law and the organization of New Mexico and Utah with the right to admit or prohibit slavery as they chose.

President Taylor died before the passage of these acts, and Millard Fillmore succeeded to the Presidency. The most important event of his administration was the signing of the Clayton-Bulwer Treaty, regarding the inter-oceanic canal. In the election of 1852 the Democrats were successful, Franklin Pierce of New Hampshire becoming President, and William R. King of Alabama, Vice-President. The Whig nominees were General Winfield Scott and William A. Graham. The Free-Soil party nominated John P. Hale of New Hampshire and George W. Julian.

Slavery. In spite of the apparent cessation of the slavery controversy, the struggle soon revived over the organization of the territories of Kansas and Nebraska, and the doctrine proposed by Stephen A. Douglas for the regulation of these territories, known as "squatter sovereignty" (which see). This contest marked the final dissolution of the Whig party, most of the Southern members joining with the Democrats in favor of the extension of slavery, the Northerners, together with other anti-slavery factions, uniting to form the Republican party. During this time a fierce struggle for the possession of Kansas ensued between the anti-slavery and pro-slavery factions (see *KANSAS, sub-head History*). It was during Pierce's administration that Commodore Perry negotiated his treaty with Japan.

The election of 1856 again resulted in a Democratic success, James Buchanan being elected President and John C. Breckinridge Vice-President, over John C. Fremont and William L. Dayton, the Republican candidates, and Millard Fillmore and A. J. Donelson, the nominees of a new party, known as the Know-Nothings or American party. It was during Buchanan's administration that the slavery struggle came to a head. It witnessed the Supreme Court decision in the Dred Scott case, declaring that Congress had no right to prohibit slavery in the territories; the attempts upon the part of Southern statesmen to gain possession of Cuba, for the extension of slavery; and the continuation of the bitter struggle in Kansas, which resulted, in the succeeding administration, in the admission of Kansas as a free state. In 1859 occurred John Brown's raid at Harper's Ferry, which roused the most bitter antagonism in the South. The Democratic party was now practically divided, and two sets of candidates were nominated, one by the North-

ern wing and the other by the Southern wing. The former was Stephen A. Douglas, of Illinois, and Herschel V. Johnson, of Georgia, the latter, John C. Breckinridge, of Kentucky, and Joseph Lane, of Oregon. The Republicans nominated Abraham Lincoln, of Illinois, and Hannibal Hamlin, of Maine, while a third party, the successor of the American party, now known as the Constitutional Union party, nominated John Bell, of Tennessee, and Edward Everett, of Massachusetts. Lincoln was elected by a comparatively small plurality and by far less than a majority of the popular vote.

Secession. The election of Lincoln was the signal for the South to take measures to overcome the overwhelming opposition to them in the United States government, and it resulted in the secession of South Carolina on December 20, 1860. Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Virginia, Arkansas, North Carolina and Tennessee followed within the next six months, and a new nation, known as the Confederate States of America, was organized at Montgomery, Ala., in February, 1862. President Buchanan opposed secession, but denied his right to coerce the seceding states to return to the Union, and therefore he made little effort to protect government property in the South, which was being taken over as rapidly as possible by the seceding states. Efforts at compromise were made during Buchanan's administration, but without effect. A resolution introduced into the Senate by Senator Crittenden proposed to divide the Union into a slave country and a free country.

Civil War. In his inaugural address President Lincoln urged all sections and classes to come to the support of the government, but expressed his determination to prevent secession. Accordingly, he soon called for volunteers. The Confederate government also called for volunteers and retaliated for Lincoln's proclamation of a blockade by licensing privateers to prey upon Northern commerce. The war began with the bombardment of Fort Sumter on April 14, and its surrender. In April, 1862, Congress purchased and emancipated all slaves in the District of Columbia, two months later it abolished slavery throughout the territories and the public domain, and on January 1, 1863, President Lincoln issued his famous Emancipation Proclamation, which he had announced in the previous September, after the Battle of An-

tetam This proclamation set free all the slaves in states then in rebellion against the United States

During the war the President did not have the undivided support of the North His suspension of the writ of habeas corpus, the suppression of newspapers and of public gatherings, the Conscription Act of 1863 and the apparent failure of the Union armies in the field during the early years of the war, all led to serious opposition and criticism The financial problems of the war also necessitated taxes and other extraordinary measures, which became exceedingly unpopular However in the election of 1864 the Democratic party, in spite of the nomination of a popular general, George B. McClellan, was defeated, on a platform which declared that the war was a failure, and Lincoln was triumphantly reelected West Virginia, which had been separated from the old State of Virginia, soon after the beginning of the struggle, was admitted to the Union in December, 1862 The war practically came to a close on the surrender of General Lee in April, 1865, but the rejoicing which that event caused was soon overshadowed by universal sorrow at the assassination of President Lincoln, April 14 For a full account of the war, see the article *CIVIL WAR IN AMERICA* See, also, articles on the important battles and the leading statesmen and military leaders of the period

Reconstruction The problems which the close of the war would bring were anticipated by Lincoln and by Congress, and steps were taken as early as 1863 to provide for the return of the seceded states to the Union and the reestablishment of loyal state governments President Johnson, who acceded to the presidency at the death of Lincoln, carried out as far as possible his predecessor's lenient policy of reconstruction, but in so doing he won the enmity of Congress and was impeached, being saved from conviction by a single vote Meantime, Congress had passed the Thirteenth Amendment, abolishing slavery, and it had been ratified in December, 1865 It had also passed other laws, placing the Southern states in the position of conquered provinces In 1868, Arkansas, Alabama, Florida, North and South Carolina, Georgia and Louisiana were readmitted to the Union

The election of 1868 placed General U. S. Grant in the President's chair, with Schuyler

Colfax of Indiana, as Vice-President The Democratic candidates were Horatio Seymour of New York, and Francis P. Blair, Jr., of Missouri Before Grant's inauguration, the Fourteenth and Fifteenth Amendments to the Constitution had been passed, granting suffrage to the negroes The latter was ratified in March, 1870

The most important event of Grant's first term was the settlement of the Alabama claims, which were claims of the United States against England for American ships destroyed by the *Alabama*, a Confederate privateer that was fitted out in England The award was favorable to the United States The Union Pacific Railroad was completed, giving the country its first transcontinental railway, but the construction was accompanied by a stock deal which involved several members of Congress and the Vice-President in a notorious scandal, fully described in the article *CREDIT MOBILIER OF AMERICA*

The reconstruction policy of Congress led to serious difficulties in the South, which the President sought to remove, but with only partial success Irresponsible demagogues from the North secured appointment to offices in the South, and were thus placed in positions which they were nowise qualified to fill Their chief aim seemed to be to reap all possible benefit for themselves and then to leave the country when they could no longer hold office They were styled *carpetbaggers*, because it was alleged that they could carry all their personal effects in a carpetbag

This carpetbag régime and other abuses led to the formation of a secret organization among the men of the South, known as the *Ku-Klux Klan*, whose chief purpose was to resist the carpetbaggers and to prevent the execution of their orders A fuller account of these events will be found in the articles *RECONSTRUCTION* and *IMPEACHMENT*, and in the articles on the various Southern states under the subhead *History*

The Credit Mobilier scandal led to a demand for a reform in the civil service, which was made an important issue in the succeeding campaign This issue, with that of reconstruction and the tendency of the Republicans to centralize power, led to the formation of a new party, the Liberal Republican party, whose candidates, Horace Greeley and B. Gratz Brown, were endorsed by the Democratic convention However, General Grant

was reelected, with Henry Wilson of Massachusetts as Vice-President, Greeley having died before the count of the electoral votes. In the same election the Prohibition party and a labor reform party first appeared.

Grant's second term was troublesome. Soon after his reelection he was confronted by a difficulty with Spain. A Spanish warship seized the American merchantman *Virginius*, which was carrying munitions and other supplies to the rebels in Cuba. Four Cubans who were on the vessel, the captain and thirty-six of the crew, were executed by orders of the Spanish authorities. The affair came near leading the country into war with Spain, but it was finally settled by diplomacy. Another difficulty was caused by the alliance of several Federal revenue collectors with distillers for the purpose of defrauding the government of the excise tax on whisky. This *Whisky Ring*, as the combination was called, had influential friends in the Treasury Department at Washington, and it was a long time before the loss of revenue could be located. The "ring" was finally exposed, the officials implicated were dismissed from office and the distillers were prosecuted and convicted, but most of the prominent ones were pardoned. There was a controversy over the resumption of specie payments and a disastrous financial panic in 1873. Indian troubles culminated in a war with the Modocs and Sioux, during which General Custer and his entire force were massacred.

In 1876 the Centennial Exposition was held in Philadelphia to commemorate the first century of the nation's independence. It was the first great international exposition held in America, and all the leading nations of the world were represented.

Industrial and Economic Progress. Discontent with Grant's administration increased. The Democrats gained a majority in Congress and made a hard fight for the election of 1876. Their candidate, Samuel J. Tilden, received a majority of the popular vote, but was defeated by one electoral vote, as a result of an investigation by a specially constituted electoral commission, which considered the disputed returns from several states. The successful candidate, President Hayes, immediately withdrew United States troops from the South and thus paved the way for a return of good feeling between the two sections. His term was also notable for the rise of a party representing the laboring

classes, which demanded a bimetallic standard of money, the suppression of national bank notes, the institution of an income tax and the prohibition of Chinese immigration. This party became known as the Greenback party. In 1878 the Bland-Allison Bill, which required the government to purchase not less than \$2,000,000 nor more than \$4,000,000 of silver per month, was passed, and in the following year specie payments were resumed. In 1880 within the Republican party arose a fierce contest for control between the followers of Ulysses S. Grant who demanded for him a third term, and those of James G. Blaine and John Sherman. James A. Garfield, of Ohio, a compromise candidate, was finally chosen, however, and was victorious over General Winfield S. Hancock, the Democratic nominee, and James B. Weaver, the Greenback-Labor candidate.

The early part of Garfield's administration was marked by the continuation of the party contest and by the disclosure of frauds in the postal service. President Garfield was assassinated in July, 1881, and died in the following September. Chester A. Arthur becoming President. During his administration the Edmunds law against polygamy was passed, also a bill suspending Chinese immigration for ten years. Civil service reform was forced to the front by the Democratic party, and in 1884 their nominee, Grover Cleveland, of New York, was elected over James G. Blaine by a small popular plurality. The election disclosed an independent movement in the Republican party, which was led by some of the most prominent Republicans in the country. Benjamin F. Butler, of Massachusetts, was the candidate of the Greenback-Labor party, and John P. Sant John was the candidate of the Prohibition party.

President Cleveland proceeded to extend the civil-service reform to a vast number of offices, thus securing the antagonism of many of the political leaders in his own party. The death of Vice-President Hendricks made necessary the passage of a law governing the Presidential succession. During the same administration a new anti-polygamy law, the Interstate Commerce Act of 1887 and a law prohibiting Chinese immigration, were passed. The administration was characterized by an unprecedented use of the veto power, especially upon private pension bills. The campaign of 1888 turned upon the tariff,

which President Cleveland had brought forward as an issue by a late message in December, 1897 Cleveland was nominated by the Democrats in that year, but was defeated by the Pepphlean candidate, Benjamin Harrison, though Cleveland received a majority of the popular vote

Harrison's administration was notable for the remarkable diplomacy of James G. Blaine, for the extension of the policy of reciprocity, for the passage of the McKinley Tariff Bill, the extension of the pension system by a dependent pension law, passed in 1890, by the repeal of the Bland-Allison law and the substitution of the Sherman Silver Purchase Act, requiring the Secretary of the Treasury to purchase 4,500,000 ounces of silver each month and to coin 2,000,000 ounces into dollars monthly The monarchy in the Hawaiian Islands was overthrown, and a bill favoring annexation to the United States was passed by Congress In 1892 the Democratic party returned to power, with Grover Cleveland and Adlai E. Stevenson as its candidates, the Republicans having nominated President Harrison and Whitelaw Reid The People's party, or Populists, the successor of the Greenback-Labor party, nominated James B. Weaver of Iowa and received 22 electoral votes

Financial Depression The second administration of Cleveland opened with a terrible financial panic, with which most of the early important events of his term were connected, especially his efforts to repeal the Sherman law, his issuance of bonds to replenish the treasury gold reserve and the passage of the Wilson Tariff Law The treaty of annexation of Hawaii was also withdrawn from the Senate, and the United States government made an effort to reestablish the monarchy over the islands Cleveland's term was also marked by the successful intervention of the United States in a boundary dispute between Venezuela and Great Britain, by a great world's fair at Chicago, by the settlement of the Bering Sea controversy over the seal fisheries, by the extension of the civil service reform and by a great strike of railroad employees, which necessitated the calling out of Federal troops The Democratic party failed to support the President in his financial policy, and at its convention in 1896 it nominated William Jennings Bryan of Nebraska for President, upon a platform demanding the free and unlimited coinage of

silver on the ratio of 16 ounces of silver to one ounce of gold The Republicans nominated William McKinley of Ohio A faction of the Democratic party formed a new organization, known as the National Democratic party, favoring the gold standard, and nominated John M. Palmer of Illinois The Prohibitionist candidate was Joshua Levering, the Socialist Labor standard bearer was Charles H. Matchett The Populist party endorsed Bryan and the Free Silver Prohibition party nominated Charles E. Bentley McKinley was elected by a large electoral and popular majority

Spanish-American War and its Effects The most important episode of McKinley's term was the Spanish-American War (which see) It resulted in the abolition of Spanish rule in Cuba and the establishment of military government under the United States, which continued until 1902, when the Republic of Cuba was organized The war also brought into the possession of the United States the Philippine Islands and Porto Rico In 1898 Hawaii was annexed to the United States, and in 1900 it was made a territory

A law establishing the gold dollar as the standard of currency was adopted in 1900, and bills reorganizing the army and abolishing the army canteen were passed in 1901 The United States participated in a joint international military expedition to China, to assist in the suppression of the Boxer rebellion, in 1900 The diplomatic events following this expedition emphasized the change in the position of the United States in international affairs, and showed its new rank as a world power

The chief issues in the campaign of 1900 were imperialism, that is, the question of the retention of the Philippine Islands, and the trust problem McKinley was again the Republican nominee, and Bryan was the Democratic candidate McKinley was elected by an increased majority Soon after his inauguration, President McKinley was assassinated, while attending the Pan-American Exposition at Buffalo, and he was succeeded by Theodore Roosevelt, who retained McKinley's Cabinet and furthered his policy

Commercial and Economic Expansion During Roosevelt's administration, the important events were the passage of the Chinese Exclusion Bill, a law providing for the irrigation of the arid lands of the West, the conclusion of a reciprocity treaty with

Cuba; the creation of a department of Commerce and Labor, which in 1913 was reorganized into the Department of Commerce and the Department of Labor, the passage of the bills for the reorganization of the militia, the increase of the navy and the creation of a general staff for the army; the passage of an anti-trust law in 1903, the ratification of a treaty between the United States and Great Britain, giving the United States the right to construct and maintain a canal across the Isthmus. In 1904 a treaty was concluded with the new Republic of Panama providing for the construction of the Panama Canal. Roosevelt's administration was also marked by the successful conclusion of a treaty fixing the boundary between Alaska and the Northwest Territories of the Dominion of Canada, the result being generally favorable to the United States. The campaign of 1904 turned on the personalities of the candidates and on the questions raised by the policy of the Roosevelt administrations. Roosevelt was elected by a large majority over Alton B. Parker, the Democratic candidate. The successful intervention of President Roosevelt to end the Russo-Japanese War, the prosecution of several large corporations for violation of the anti-trust law, the agitation for regulation of railroad rates, the rigid investigations of insurance corporations, and the movement for the conservation of natural resources are important in Roosevelt's second administration.

Republican Defeat. In the election of 1908, William Howard Taft, the Republican candidate, was successful over Bryan. In the spring of 1909 the President called Congress in special session to revise the tariff. But the new tariff was unpopular, and was one of the strongest factors in causing the election of a majority of Democrats to the House of Representatives in 1910. This Congress passed acts for the admission of Arizona and New Mexico as states, and considered a reciprocity treaty with Canada which was finally rejected by the Canadians.

The election of 1912 was marked by a split in the Republican party. The regular Republicans renominated Taft and Sherman, but the supporters of Roosevelt, charging that they had been defrauded of their rights in the convention, withdrew, held a convention of their own and formed the national Progressive party, which nominated Roosevelt for President and Hiram Johnson of Cal-

ifornia for Vice-President. The Democratic candidates, Woodrow Wilson and Thomas R. Marshall, were elected by a plurality of more than 2,000,000 votes.

Wilson's Administration. Immediately after his inauguration President Wilson called Congress in special session to revise the tariff; the Underwood-Summons Tariff Act was the result. Other important legislation included the Federal Reserve Act of 1913, establishing the Federal Reserve Banks, the Clayton Anti-Trust Act, the Trade Commission Act, and the repeal of the clause exempting American ships from paying toll for passing through the Panama Canal, in 1914. The opening of the Panama Canal to commerce, the international expositions at San Francisco and San Diego, Calif., the Bryan arbitration treaties with most of the world's civilized nations, and the proclamation of the seventeenth amendment to the Constitution were other important events of Wilson's first term.

Foreign relations occupied the attention of the President and of Congress to an unusual extent. During Taft's administration a revolution occurred in Mexico. Madero, the President, was assassinated, and Huerta, who was considered responsible for Madero's death, had assumed the Presidency. Wilson refused to recognize Huerta, but maintained a strictly neutral policy towards Mexican affairs, notwithstanding many insults were offered to American citizens and the government of the United States.

Affairs came to a crisis in April 1914, when a number of marines from a United States warship stationed at Tampico were arrested by Huerta's soldiers, while they went ashore peacefully to purchase supplies. Rear-Admiral Mayo demanded the release of the men, an apology and a salute to the United States flag. Huerta refused to salute the flag, and the President applied to Congress for permission to employ the military and naval forces to enforce his demands. His request was granted, and United States forces occupied Vera Cruz. There was a strong demand for intervention, but the President continued his policy of "watchful waiting", in the belief that the forces under Carranza would soon overthrow Huerta, and thus they finally accomplished.

After Carranza became President, Villa, his chief aid in the overthrow of Huerta, rebelled and gained control over a number

of the northern states of Mexico In 1916 Villa's forces made a number of marauding raids into Texas, Arizona and New Mexico, and a punitive expedition under command of General Pershing, in conjunction with the forces of Carranza, attempted to capture Villa, but he escaped to the mountains, and in course of time the United States force was withdrawn

The embargoes and blockades established by the belligerent nations in the World War complicated American relations with these nations, especially with Great Britain and Germany, because of the effect of these measures upon American commerce The sinking of the *Lusitania*, May 7, 1915, by a German submarine, came near severing diplomatic relations between the United States and Germany, but the Imperial Government made promises that partially satisfied the President, and the breach was avoided Germany's acts aroused intense feeling against the country in the United States, and many Americans expected and desired war

In the campaign of 1916 the nominees of the Republican party for President and Vice-President were Charles Evans Hughes of New York and Charles W. Fairbanks of Indiana President Wilson and Vice-President Marshall were the Democratic nominees The Republicans attacked the President's foreign policies, such as his "watchful waiting" in regard to Mexico and his long drawn-out diplomatic contest with Germany, and they opposed the economic theories of the Democrats The Democrats asked for an endorsement of Wilson's record for constructive statesmanship in domestic affairs and approval of his forbearance and patience in the handling of intricate international problems One of the rallying cries of the Democrats was "Wilson kept us out of war" The election was very close, for the country was plainly confused as to the exact attitude of both parties toward Germany Wilson and Marshall secured 270 electoral votes and Hughes and Fairbanks 255 The Republicans carried the East and several Middle West states, the Democrats carried most of the West, part of the Middle West, and the South solidly In general, the President ran ahead of his party, but the Democratic majority in Congress was considerably reduced

The Approach of War In spite of his record as a peace President, Wilson was forced to lead the country into the World

War early in his new administration On January 31, 1917, the German government made known its decision to begin unrestricted submarine warfare The President was informed that American ships of any kind whatsoever violating certain specified regulations would be sunk without warning This decision was the culmination of a long series of insults on the part of Germany, including the indefensible activities of an unscrupulous and well-organized spy system

With the approval of the majority of the people, the President on February 3 broke off diplomatic relations with Germany and handed Count Bernstorff, the German ambassador, his passports After several weeks of uncertainty, during which German aggressions continued unchecked, the President (April 2, 1917) appeared before a special session of the Sixty-fifth Congress, and in a speech of moving eloquence asked that body to declare that a state of war existed between the Imperial German government and the United States The next day the Foreign Affairs Committees of both houses agreed upon a resolution formally declaring this fact On April 4 the Senate passed the resolution by a vote of 86 to 6 and the House took similar action on April 6 by a vote of 373 to 50 On the afternoon of that day the resolution was signed by the President

In the World War. Measures relating to the prosecution of the war were given immediate consideration As emergencies arose, laws conferring extraordinary powers upon the President, providing for regulating the distribution of food and fuel, placing the operation of the railroads and finally of the telegraph and telephone lines under control of the government, were passed Regardless of party, Congress and the nation supported the President in the prosecution of the war Taxes were increased, and five government loans aggregating over \$19,000,000,000 were authorized and oversubscribed Never before had a nation accomplished a task of such magnitude within the allotted time as did the United States in prosecuting the war with Germany

At the declaration of war America had an army of less than 200,000 men The nation was insufficiently supplied with arms, munitions and other equipment for a large army, and was without sufficient ships for transporting men and supplies to Europe Through the cooperation and help of its

Outline on the United States

- I. LOCATION AND EXTENT
 - (a) Latitude
 - (b) Longitude
 - (c) Boundaries
 - (d) Area
 - (e) Comparison with other countries
- II. SURFACE AND DRAINAGE
 - (a) Atlantic slope
 - (b) Appalachian highlands
 - (c) Great central plain
 - (d) Rocky Mountain highlands
 - (e) Pacific slope
 - (f) River systems
 - (g) Lakes
- III. CLIMATE
 - (a) Conditions expected, due to latitude
 - (b) Changes wrought by physical conditions
 - (c) Average temperature in various sections
 - (d) Average rainfall in various sections
 - (e) Need for irrigation
- IV. INDUSTRIES
 - (a) Mineral resources
 - (1) Where each is found
 - (2) Annual output and value
 - (3) States leading in production
 - (b) Agricultural products
 - (1) Cereals
 - (2) Fruits
 - (3) Market gardening
 - (4) Live stock and dairy products
 - (c) Manufactures
 - (1) Natural locations of districts
 - (2) Leading industries
 - (a) Iron and steel
 - (b) Textiles
 - (c) Boots and shoes
 - (d) Others of note
 - (e) Rank with other nations in production
 - (d) Commerce
 - (1) Domestic commerce
 - (a) By rail
 - (b) By water
 - (c) Coasting trade
 - (2) Foreign commerce
 - (a) Leading countries included in
 - (b) Exports and imports
 - (c) Principal countries engaged in carrying trade
- V. POPULATION
 - (a) Per cent of annual increase
 - (b) Center and density of population
 - (c) Comparative growth of cities and rural communities
 - (d) Immigration
- VI. GOVERNMENT
 - (a) General character
 - (b) Departments
 - (1) Executive
 - (a) President
 - (b) Vice-President
 - (2) Legislative
 - (a) Congress
 - (1) Senate
 - (2) House of Representatives
 - (3) Judicial
 - (a) Supreme Court
 - (b) Inferior courts
 - (1) Circuit courts
 - (2) District courts
 - (3) Courts of appeals
 - (c) State governments
 - (d) Government of dependencies
 - (e) Territories
- VII. EDUCATION IN UNITED STATES
- VIII. CITIES
 - (a) List of twenty-five largest
- IX. HISTORY
 - (a) Periods
 - (1) Discovery and exploration
 - (2) Colonization
 - (3) Development of colonies
 - (4) War for independence
 - (5) Organization of republic
 - (6) National growth

(a) Development of resources

(b) Annexation of territory

(7) Mexican war

(8) Slavery issue

(9) Civil war

(10) Reconstruction

(11) Industrial progress

(12) Spanish-American war

(13) World War

(14) Prohibition era

(15) Stock-market crash

(16) Bank failures

(17) "New Deal" Policies

Questions on the United States

How does the United States compare in area with the other great countries of the world?

What change does a ship have to make in its dates in going from San Francisco to the Philippine Islands?

What geographic conditions exert the greatest influence upon human development?

What effect does the geographic position of the United States have upon her industrial development?

How does this location affect her relations to other countries?

Why were the English colonies confined to a narrow strip of land along the Atlantic Coast?

What is the most remarkable feature of the boundary line between the United States and Canada?

Why is the Atlantic coast line so much longer than that on the Pacific?

Which coast has the larger number of good harbors? Why?

What is the Fall Line? Why is it so called?

What part of the United States is the greatest agricultural region in the world?

What conditions have made it so?

Account for the location and growth of the following cities New York, Chicago, Galveston, Seattle

How many railroads extend across the United States from the Mississippi River to the Pacific Coast?

What effect have these so-called trans-

continental lines had upon the development of the country west of the Mississippi River?

How does the Constitution of the United States differ from the Articles of Confederation?

What political party supported the ratification of the Constitution? From what circumstance was this party named?

What American inventions have exerted the greatest influence upon the industries and commerce of the world?

What regions in the United States are widely known for their scenery?

What has the National government done to preserve these regions for the people?

What island possession of the United States is about two-thirds the area of Connecticut? How does it compare with Connecticut in population?

From what nations did the United States receive the largest number of immigrants in the years just preceding the World War?

What effect did the World War have upon immigration?

How do you account for the rapid growth of cities since 1890?

What effect did the entrance of the United States into the World War have upon the American merchant marine?

What precedents of long standing did President Wilson set aside?

Why does not the United States have a national system of education?

How many hours apart by air are New York and Los Angeles?

How many Americans were killed in the World War? How many died of disease? How many were wounded?

How important are the new oil fields in Texas?

What cities in the United States are almost directly north of the city of Panama, at the western terminus of the Panama Canal?

What is the official status of child labor in the United States?

What is the status of Porto Rico?

What is the "Galveston plan" in the government of cities?

allies, the unstinted devotion and loyalty of the American people and a speeding up of all war activities, the United States placed on the battlefields of France over 2,225,000 soldiers, trained and equipped, including needed men back of the lines. The American army played an important part in the operations of the summer of 1918, and contributed materially to bringing about an armistice on November 11, 1918. (For a full account of the nation's war activities, see the article **WORLD WAR**.)

The Way to Peace. President Wilson had, during the war, issued a statement summarizing the objects for which America was fighting. These were grouped in fourteen paragraphs, the last one calling for a general association of nations. He led an American delegation to the peace conference in Paris in 1919. The conference finally drafted treaties between the warring nations, including the establishment of a league of nations. President Wilson submitted the treaty to the United States Senate in May, 1919, but the Senate refused to ratify it, and it was not until 1921 that separate treaties were made with Germany and its allies.

Constitutional Amendments. The eighteenth (prohibition) amendment to the Constitution, was ratified by the States and became effective January 16, 1920. The nineteenth amendment, extending suffrage rights to women, was ratified in 1920. The twentieth amendment, changing the time for sessions of Congress and inauguration of the President, was ratified in 1933. The twenty-first amendment, repealing the eighteenth, was ratified in 1933.

Later Events. In 1920 Warren G. Harding was elected President and Calvin Coolidge Vice President. Important events in Harding's administration were the Limitation of Arms Conference in Washington, which resulted in an agreement for a naval holiday, a law to restrict immigration, the enactment of a budget law, and an extension of the program of aid for veterans of the World War. President Harding died in 1923, and was succeeded as President by Vice President Coolidge. (See **HARDING, WARREN G.**)

The Coolidge administration was a period of peace and recovery from the effects of war. The budget system was continued, taxes were reduced and greater economy was exercised in government affairs. Congress passed a new income tax law, and passed a soldiers'

bonus law over the President's veto. (See **COOLIDGE, CALVIN**.)

In 1928, Herbert Hoover, Secretary of Commerce since 1920, was elected President by a record popular vote. To meet the demands of a depressed agriculture President Hoover advocated measures for farm relief. The Smoot-Hawley tariff act was passed in 1930, it increased duties on many farm products. To aid world recovery, President Hoover, in 1931, presented a plan, which was adopted, for a moratorium of one year on the payment of war debts. For other events in this administration, see **HOOPER, HERBERT**.

A severe economic and industrial depression which developed during the last years of the Hoover administration resulted in the victory of the Democratic ticket in the general election of 1932. Hoover was defeated for reelection, and Franklin D. Roosevelt was elected President by an overwhelming vote. At the outset of his administration a banking crisis was promptly met by Congress, which invested the President with power to regulate transactions in credit, currency, and other banking functions. Within a few short weeks measures were undertaken providing for unemployment relief, economy in government expenditures, farm relief, a national recovery act, designed to regulate industry, reduce hours of labor and increase wages, was passed, but in 1935 declared largely unconstitutional. The President was given powers to enforce the new laws and regulations. An embargo on gold export took the country off the gold standard and resulted in inflation of the currency and higher prices.

Related Articles. At the end of each state article the reader will find listed the names of the cities, mountains, lakes and rivers of the region under discussion, as well as important historical events connected with the development of each state. There are other important lists following the articles on Agriculture, Education, and the different wars in which America has engaged, to all of which the reader is referred. Below are various other topics which will help one to secure detailed information on the subject.

PHYSICAL FEATURES

Alleghany Mountains	Niagara Falls and
Appalachian Mountains	River
Canyon	Ohio River
Cascade Range	Palleades
Coast Range	Parks, National
Colorado, Grand	Piedmont Region
Canyon of the	Rocky Mountains
Columbia River	Royal Gorge
Glacier National Park	Saint Lawrence River
Great Lakes	Sierra Nevada Mountains
Mammoth Cave	Yellowstone National
Mississippi River	Park
Missouri River	Yosemite National
Natural Bridge	Park

INDUSTRY AND PRODUCTS

Agriculture
Automobile
Barley
Bookbinding
Boots and Shoes
Brick and Brick-
laying
Coal
Copper
Corn
Cotton
Cotton Gin
Dairying
Dry Farming
Fish and Fisheries
Forests and Forestry
Fur and Fur Trade
Gold
Horticulture
Iron

IRRIGATION

LEAD

LEATHER

LUMBER

MEAT PACKING

NATURAL GAS

OATS

PAPER

PETROLEUM

POTATOES

POULTRY

PRINTING

SEAL

SILVER

STEEL

TEXTILES

TOBACCO

WHEAT

ZINC

TRANSPORTATION AND COMMUNICATION

Cable, Submarine
Canal (with list)
Railroad

ROADS AND STREETS

TELEPHONE

TELEGRAPH

OUTLYING POSSESSIONS

Alaska
Guam
Hawaii
Philippine Islands

PORTO RICO

SAMOA

VIRGIN ISLANDS OF THE UNITED STATES

PRESIDENTS

See President of the United States

STATESMEN, MILITARY LEADERS, ETC.

See Biography

GOVERNMENT AND HISTORY

Alabama The
Allen and Sedition
Laws
Black Hawk
Boston Massacre
Boston Tea Party
Burr Aaron
Chesapeake The
Clayton-Bulwer
Treaty
Confederation,
Articles of
Congress
Constitution of the
United States
Carpenters
Courts
Declaration of Inde-
pendence
Electoral College
Electoral Commission
Emancipation Procla-
mation
Embargo
Eric the Red
French and Indian
Wars
Genet, Edmon
Hay-Fauncetote
Treaty
Indians American
Jay Treaty
Kentucky and Vir-
ginia Resolutions
Ku-Klux Klan
Lecompton Constitution

LOUISIANA PURCHASE

MEXICAN WAR

MISSOURI COMPROMISE

MONROE DOCTRINE

MOUND BUILDERS

NATIONS LEAGUE OF

NAVIGATION ACTS

NON-INTERCOURSE ACT

NORTHWEST TERRITORY

NULLIFICATION

ORDINANCE OF 1787

OSTEND MANIFESTO

PANAMA CANAL

POLITICAL PARTIES IN

THE UNITED STATES

PROHIBITION

PURITANS

REPRESENTATIVES,

HOUSE OF

REVOLUTIONARY WAR

SENATE

SILVER

SPANISH-AMERICAN

WAR

SQUATTER SOVEREIGNTY

STAR ROUTE

SUPREME COURT

TARIFF

VERSAILLES TREATY OF

WAR OF 1812

WHISKY INSURRECTION

WILMOT PROVISION

WOMAN SUFFRAGE

WORLD WAR

X Y Z CORRESPONDENCE

UNITED STATES STEEL CORPORATION

TION, the largest business enterprise in the world, was organized in 1901, by the consolidation of a number of large corporations engaged in the manufacture of iron and steel. These included the Carnegie, the Federal Steel, the American Steel and Wire, the National Steel, the National Tube and the American Tin Plate companies. The United States Steel Corporation makes more steel than all of Great Britain or Germany,

and one-fourth of the total amount made in all the countries of the world. Many of the employees have become stockholders, and the corporation has a commendable record in its dealings with its great army of workmen. In 1911 the United States government brought suit for the dissolution of the corporation on grounds of violating the Sherman Anti-Trust Law, in 1915 the courts sustained the corporation and an appeal was taken to the Supreme Court. This court decided that the corporation need not be dissolved.

The capital of the corporation is over \$1,000,000,000, its gross revenues sometimes have exceeded a million dollars a day.

UNIVERSALISTS, a religious body whose distinctive belief is that all men will ultimately be saved, in other words, that eternal progress is the lot of every created soul. This, they claim, is in harmony with the teachings of Jesus and early interpretations of the Bible, as well as with science and philosophy. As a faith universalism has a place in Christian thought far beyond the confines of the organized body, which was established late in the eighteenth century in Massachusetts by an English clergyman, John Murray. There are now about 55,000 Universalists in the United States and 2,000 in Canada.

UNIVERSAL LANGUAGE, a proposed medium of communication, for the use of all peoples of the earth which have commercial intercourse with each other. There have been two unsuccessful efforts in this direction within recent years, Esperanto and Volapuk (which see).

UNIVERSE, *u'n'v'ers*, a term referring to all created things, embracing everything included in space, planets, suns, stars, considered as an orderly system. Man's idea of the universe has been an expanding one. At first he considered the earth the center about which sun, moon and stars revolved. Then he discovered that earth, asteroids and planets revolve about the sun and thought of our solar system as the universe. Now he knows that the system of which our earth is a part is but one among the millions whirling majestically in the immensity of space. The universe in its vastness is beyond the power of the mind to conceive.

Related Articles Consult the following titles for additional information

Astronomy	Planet
Earth	Stars
Moon	Solar System
Nebular Hypothesis	Sun



UNIVERSITY, an institution for advanced learning or for the examination of students who have completed specified courses in the higher branches. Universities are maintained in nearly all countries, and they confer degrees which receive universal recognition. A study of the organization of the universities of different countries shows that there are some variations in plan and spirit, but everywhere the term *university* implies a greater number of departments and courses of study than does *college* (which see).

Some universities and colleges with continuous existence since they were founded are among the oldest institutions of man. In the American Union, Harvard (1636), William and Mary (1693), Yale (1701), Moravian Seminary and College for Women (1742), Princeton (1746), University of Pennsylvania (1749), Washington and Lee (1749), Columbia, for many years King's College (1754), Brown University, (1764), Dartmouth (1769), Hampton-Sydney (1776), are older than the United States.

It is believed that the oldest university in the world with a continuous existence is El Azhar, in Cairo, Egypt, it was founded in 972 of the Christian Era, or 361 by Mohammedan calculation. The University of Pavia, Italy, was founded by Lothair, grandson of Charlemagne, in 825, but its history has not been continuous. The University of Bologna, Italy, was organized as a body of students in 1088, it reverted to the standard type in 1200. The oldest university in the New World is still in operation at Lima, Peru, dating from 1551.

In the United States in the United States the term *university* has been used indiscriminately and is sometimes applied to degree-conferring institutions regardless of their provision for graduate work. Moreover, many schools established in the newer states, either by private or denominational enterprises, have been styled universities when they are really colleges offering courses given in the undergraduate department of the true university.

A university maintains a college of liberal arts, and faculties of law, medicine, engineering, agriculture, journalism, etc. In the universities of highest standard students entering the professional departments are required to have two or more years of college work.

According to the plan upon which they have been established, American universities can be grouped into the following classes:

(1) Those which have developed from older colleges, such as Harvard, Yale, Pennsylvania and Princeton.

(2) Those that have been established by act of legislature and are known as state universities, such as the universities of Michigan, Minnesota, Wisconsin and Illinois.

(3) Those that have been established by benefactions, such as Johns Hopkins and Cornell.

(4) Those established under the auspices of some religious denomination, such as the Catholic University, at Washington, the University of Chicago, and Northwestern University, at Evanston and Chicago.

All of these institutions maintain undergraduate, or college, departments, and in some of the newer states the state university is under the necessity of maintaining a preparatory school.

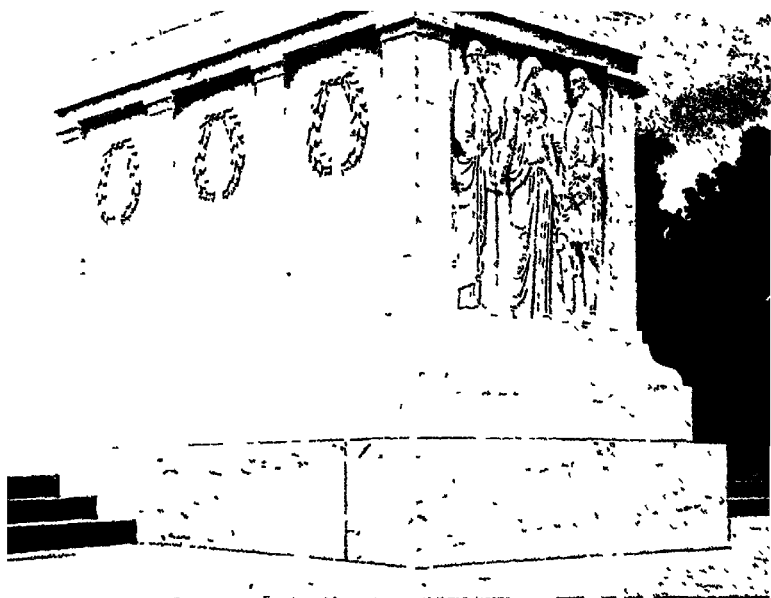
In Canada. Provincial and endowed universities and colleges are maintained in the Dominion in large numbers. The universities of British Columbia, Alberta, Saskatchewan and Manitoba correspond in a general way to the American state universities. In Ontario the University of Toronto is at the head of the school system. In Quebec the two leading universities, McGill and Laval, are at the head of the Protestant and Catholic schools, respectively.

(For more detailed information, consult the articles on the various institutions and provinces.)

Related Articles. The most important universities of the world are described in these volumes under their separate headings. They are listed at the end of the article *Education*. Each of the American state universities is given separate treatment in alphabetical order.

UNIVERSITY EXTENSION, a movement for extending the means of a higher education to persons of all classes, by a system of lectures and instruction, carried on by instructors of an established university. University extension originated with Cambridge University, England, in 1872, and it was taken up by the University of Oxford in 1885.

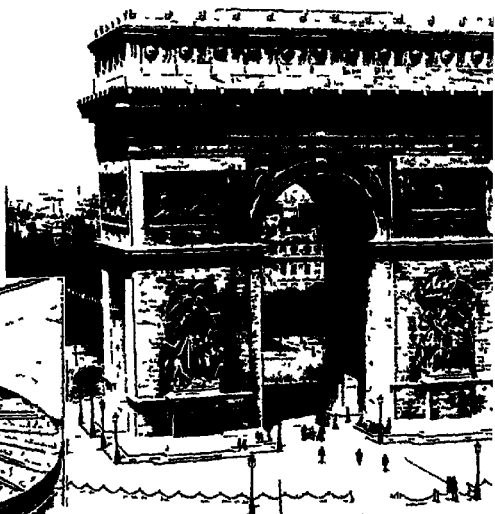
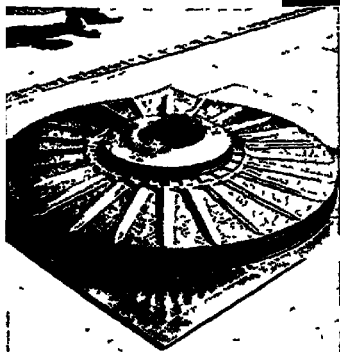
In the United States the movement was



Living Gallows

TO THE "UNKNOWN SOLDIER"

Above The tomb of America's Unknown Soldier, in Arlington National Cemetery, overlooking Washington Below The tomb of the French Unknown is in Paris, below the pavement under the Arch of Triumph, at left is shown the Eternal Flame that burns above the grave



systematically started by Doctor Melville Dewey in 1888. At that time Doctor Dewey was chief librarian of Columbia University, and he laid before the regents of the University of the State of New York a plan for university extension, in connection with public libraries. Two years later a committee of the New York colleges and universities urged the regents to establish such a system of teaching under state supervision, and in 1891 a bill passed the legislature, appropriating \$10,000 for the expenses of organizing the movement. Previous to this, some extension work had been done by the professors of Johns Hopkins University, who, however, conducted it as an individual enterprise, and in 1891 the University of Pennsylvania organized a corps of lecturers, who were to lecture on literature, history, sociology and science in the surrounding towns, wherever local organizations for the study of any of these subjects could be formed. From these beginnings the larger universities took up the work, and it gradually extended over the country. The most successful work has been done by the universities of Pennsylvania, Cornell, Harvard, Yale, Chicago and Wisconsin.

The plan includes (1) the arrangement of lecture study courses with syllabi, by the faculties of the university, (2) the organization of local centers, these centers to include people who are interested in pursuing some one of the lecture courses, they decide upon the subject to be studied and engage the lecturer, whose salary and traveling expenses are paid by the center, (3) the lecture, with studies conducted either before or after it, the lecturer carrying on a quiz, in which he gives opportunity for free discussion, asking and answering questions, (4) traveling libraries, which are sent to the different centers, (5) the preparation of papers by members of the center, these papers being read and graded by the lecturer, (6) the giving of credits by the university, for satisfactory completion of the work. These credits are of limited value to those who are seeking degrees. Agricultural colleges in some states have extension departments which render very practical assistance to the farmer and his family. The extension department of the University of Wisconsin is intended to cover practically all lines of industry in the state. See CHAUTAUQUA INSTITUTE.

UNKNOWN SOLDIER TOMBS After the World War, national commissions sought to identify and give burial in special war cemeteries to the honored dead of the allied nations. It was found impossible to identify or to locate the remains of many thousands of these. A sentimental gesture to honor collectively the unknown dead from each of the principal allied countries brought the highest patriotic response from all the people.

The United States took the body of an unidentified soldier of the American armies from his nameless grave in France, brought it home on a warship, and buried it impressively in Arlington National Cemetery. The body of a British unknown was solemnly interred within the precincts of Westminster Abbey. France's unknown hero was taken to Paris and buried beneath the *Arc de Triomphe* (Arch of Triumph), where burns an everlasting flame. Belgium selected one of its unknown dead and gave him a resting place in Brussels, at the base of the Colonnade of the Congress. Italy's selection for the honor of representing all of that country's unknown dead lies beneath a hilltop monument in Rome.

UPAS, a tree belonging to the same family as the mulberry and breadfruit, common in the forests of Java and the Philippine Islands. The exaggerated stories formerly current concerning the deadly exhalations of this plant are now believed to have their origin in the presence of volcanic gases in the Javanese valleys. The sap, however, is poisonous and forms the principal element in a mixture used by the natives for tipping their arrowheads. The fiber of the bark is made into a kind of cloth.

URAL MOUNTAINS, a low mountain range in Russia extending southward from the Arctic Ocean, approximately along the 60th meridian of east longitude, and forming a portion of the boundary between Europe and Asia. The highest elevations are in the northern and southern sections and exceed 5,000 feet. The central section is low, and through a pass in this part of the range the Trans-Siberian Railway reaches Siberia. The lower slopes are covered with forests of evergreens, birch and beech. The Central Urals are rich in minerals, which include gold, silver, copper, iron, lead, zinc and platinum. There are also large deposits of coal.

URAL RIVER, a river of Russia, rising on the eastern slope of the Ural Mountains and flowing southward a distance of 1,400 miles into the Caspian Sea. Its chief tributaries are the Kizil and the Sak-Mara from the west, and the Sunduk, the Or and the Ilek from the east. Rainfall in the Ural basin is slight, and the river is shallow and unnavigable, except during the period of high water.

URANIA, in Greek mythology, the muse of astronomy, usually represented as holding in her left hand a celestial globe and in her right a staff or compass.

URANIUM, a rare, silvery-white metallic element, found chiefly as an oxide in pitchblende. It is the source of uranium yellow, used for painting on glass and porcelain, and in making the fluorescent yellow uranium glass. With its compounds, uranium is radioactive, undergoing slow disintegration with the formation of a new element, known as uranium X. See **RADIOACTIVITY**.

URANUS, the seventh planet from the sun, discovered by Sir William Herschel in 1781 and first called *Georgium Sidus*, in honor of George III, and afterwards *Herschel*, in honor of the discoverer. Both these names falling into disuse, the name *Uranus*, suggested by Bode, was adopted. Its mean distance from the sun is more than 1,750,000,000 miles. The length of its year is equal to about eighty-four of our years, the length of its day is thought to be about ten hours. Its mean diameter is estimated at about 33,000 miles. Its volume is about seventy-four times that of the earth, but its mean density is so much less that the mass of Uranus is only about twelve and one-half times as great as that of the earth.

Uranus has four satellites, which differ from those of all but one of the other planets, in that their orbits are nearly perpendicular to that of the planet, while the satellites of the other planets revolve in nearly the same plane as the planet to which they belong. Through the telescope, Uranus is merely a pale, greenish disk, with no certain markings, but the spectroscope seems to indicate that it differs materially from the other planets in composition. To the naked eye it appears like a star of the sixth magnitude. See **PLANET**.

URANUS, in Greek mythology, the husband of Gaia, the earth, and father of her children, the Titans and Cyclopes. Uranus

hated his children and confined them in Tartarus, but on the instigation of Gaia, Saturn, the youngest of the Titans, overthrew and dethroned him. From the part of his blood which fell upon the earth sprang Gigantes, father of the giants, and from the part which fell into the sea sprang the goddess Aphrodite.

URBAN, the name of eight Roman Popes, three of whom made notable contribution to history.

Urban I, SAINT, was bishop of Rome from 222 to 230. He was a strong pontiff, setting himself firmly against the schismatic movement of Hippolytus, which he kept in check.

Urban II was Pope from 1088 to 1099. He successfully prosecuted the struggle of the Papacy against Henry IV, and in 1094 he excommunicated Philip I of France for his matrimonial infidelity. In 1095 he presided at the famous Council of Clermont, which gave the impulse to the Crusades. He died before the success of the First Crusade, which he had organized.

Urban VIII, Pope from 1624 to 1644, supported Richelieu's policy against Austria and Spain. He was the founder of the College of the Propaganda and was a patron of Galileo.

URBANA, ILL., the county seat of Champaign County, 128 miles nearly south of Chicago, on the Wabash, the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is near Champaign, and the state university is situated between the two cities (see **ILLINOIS, UNIVERSITY OF**). The surrounding region is agricultural and contains valuable deposits of fire clay. The city has railroad shops, brick works, a lawnmower and iron novelty factories. Some of the prominent structures are the courthouse, the municipal building, the Masonic Temple, a Y M C A building, Thornburn High School, the Champaign County Teachers' and Pupils' Library and the Illinois State Laboratory and Natural History Library. Urbana was settled in 1824 and was chartered as a city in 1860. Population, 1920, 10,244, in 1930, 13,060, a gain of 30 per cent.

URINE, *urine*, the fluid waste separated from the blood by the kidneys. It carries out of the system many of the worn-out tissues, especially the nitrogenous waste. Its composition varies in different animals. Human urine, of a healthy individual, is a clear, amber-colored fluid, slightly acid, and it weighs one and fifteen-thousandths to one and twenty-five thousandths times as much as water. The average quantity discharged in

twenty-four hours is about two and a half pints, but the amount varies greatly, being diminished during excessive perspiration, thirst and fever, and being increased by cold, by drinking large quantities of water, by exercise, by certain foods, as salt or sugar, and by certain drugs. The principal solid and the most important ingredient found in urine is urea, the amount of which varies, being greater when animal food is used freely than when the diet is vegetable. The condition of the urine is an index to the state of health, and physicians often analyze it as a part of their diagnosis. The presence of albumin indicates Bright's disease, and the presence of sugar indicates diabetes.

URSA MAJOR and URSA MINOR (greater bear and lesser bear), two constellations of the northern hemisphere always visible and wheeling about the Polar Star, which at present is that star in the extremity of the little bear's tail. In the larger constellation are seven bright stars which outline the Great Dipper.

UR'SO, CAMILLA (1842-1902), a famous violinist, born in Nantes, France, who came to America at the age of ten. She appeared in concert with immense success, becoming the most noted female violinist in the world.

URSULA, SAINT, a legendary saint and martyr in the Roman Catholic Church, whose story has been given various forms. She is supposed to have suffered death about the year 237. By repute the daughter of a British king, she was desired by the son of another king for his wife, if his suit were denied, her father's lands would be devastated. Ursula had vowed to remain a virgin, so she succeeded in securing a three-years' delay before deciding. During this time she was to visit holy places, and she chose 11,000 virgins to accompany her. When Cologne was reached in a voyage down the Rhine the Huns murdered all of them, a church was later built over their remains.

URSULINES, ur'su lins, or NUNS OF SAINT URSULA, a sisterhood founded by Saint Angela Merici, at Brescia, Italy, in 1537, especially for the education of girls. They had many houses in France during the seventeenth century. The Canadian Ursulines date from 1639, the Irish, from 1771. There are now four houses in Ireland, four in England and twenty-four in the United States, with thousands of pupils. The whole number is 300 convents and 7,000 nuns.



URUGUAY, ur'oo gwa, or oo'roo gwi, officially **THE EASTERN REPUBLIC OF URUGUAY**, is the smallest republic of South America. It is separated from Argentina on the west of the Uruguay River, and is bounded on the north-east and east by Brazil, the great estuary of the Rio de La Plata washes its southern shore. The country is nearly triangular in outline, its greatest length and breadth, 350 miles, are about equal, its area is 72,153 square miles, making it about one-half the size of Montana, or equal to the combined areas of North Dakota and Delaware. Population, 1934, 1,993,234.

The People. The population is about equally divided between the white and colored peoples, the latter including Paraguay Indians, or *Guaranis*, and mixed breeds. Spaniards and Italians constitute the great majority of the whites, though the Germans and French are numerous. The speech, manners and customs are Spanish. The color line is drawn in the names of the political parties which are designated as *Biancos* and *Colorados* (whites and colored), but in political practice these names have lost much of their former significance. The chief cities are Montevideo (which see), the capital, with a population of 667,212, 1934. Paysandu, on the Uruguay River, Salto, Mercedes, San José, Agosto and Maldonado.

The Roman Catholic Church has by far the largest number of adherents, and until 1916 it was the state Church. In that year the state Church was abolished, and all religious denominations were placed on an equal footing before the government.

Surface and Drainage. In the north and west there are ranges of low mountains, or hills, which attain an altitude of about 2,000 feet, and along the Uruguay River are tablelands, somewhat higher than those in Argentina, but the southeastern part of the country is low and marshy, and the interior is composed of rolling plains. The chief rivers are the Uruguay, which forms the western boundary, and its largest tributary, the Negro, which flows across the country in a southwesterly direction, dividing it into

two nearly equal parts Lake Marim, situated on the northeastern border, is partly in Uruguay and partly in Brazil. The plains in the interior and the hills in the north and northwest are covered with dense forests, and the southeastern portion of the country is overgrown with grass.

Resources and Industries. The chief minerals are iron, zinc, lead, antimony, sulphur and coal, and some gold has been found. There are also quarries of marble and other building stone, but the mineral resources of the country have not been extensively exploited. The rich soil and salubrious climate, accompanied by an abundance of moisture, make the country favorable for agriculture, yet only small areas are under tillage. The chief crops are wheat, corn, barley, millet, oats, rye and flaxseed. Stockraising is the most important industry of the country, and large numbers of horses, mules, cattle and sheep are reared.

There is a yearly average of more than 7,250,000 cattle and about 21,000,000 sheep. Wool and meat are the principal exports.

Transportation and Trade. Many of the rivers are navigable, and are used for inland transportation. There are over 1,700 miles of railway connecting the chief centers of trade within the country with those of Argentina, besides 170 miles of tramways. In proportion to its size, Uruguay has more miles of good roads than most other South American countries. All the important towns have telegraph and telephone service.

The imports consist of foodstuffs, cotton and woolen goods, clothing, machinery and other manufactured products. The exports include meats, hides, tallow, cattle, wool and a few other agricultural products.

Education. The University of Uruguay, at Montevideo, is the leading educational institution. It has departments of law, medicine, mathematics, agriculture, commerce, social service and veterinary science. There are also a preparatory school and other institutions for secondary education and normal schools for both sexes. Its library and museum are of considerable value. The public schools are poor. There is a compulsory education law, but it is not enforced, and the proportion of illiteracy is very large.

Government and History. Uruguay has a republican form of government, at the head of which is a President. This official was originally elected by the national legislative

body, consisting of a Senate and a Chamber of Deputies. In 1919 a new constitution went into effect, providing for the popular election of the President and the Council of Administration of nine members, which appoints the following members of the President's Cabinet: the Ministers of Industries and Labor, Public Instruction, Finance and Public Works. The President appoints the Ministers of Foreign Affairs, Interior, Army and Marine. The Council prepares the budget, collects the taxes, may initiate new laws, arranges loans and provides for the increase or reduction of the national currency.

Uruguay was a source of dispute between Spain and Portugal in early times, but finally became a Spanish possession, forming a part of the vice-royalty of Buenos Aires. Later Brazil attempted to enforce the Portuguese claim, and for a short time occupied the country, but in 1828 Uruguay became independent. During the World War the country severed relations with Germany.

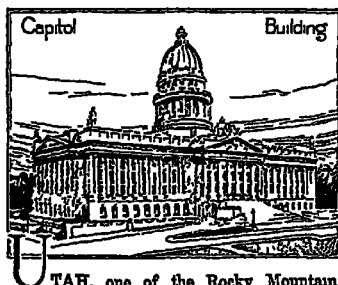
Uruguay River, a river of South America, which rises in the southeastern part of Brazil, flows westward, then southward, and enters the estuary of the Rio de la Plata. It forms a part of the boundary between Brazil and Argentina and the entire boundary between Argentina and Uruguay. Its length is about 950 miles, and in the lower part of its course it is from six to nine miles wide. It is navigable for large vessels as far as Paysandu, about 150 miles, and for smaller vessels for 300 miles farther.

USURY, u' shu ry, originally, money paid for the use of money, or interest, according to present usage, interest in excess of the legal rate. In most states a maximum rate of interest is fixed by law, and penalties of greater or less severity, imposed for charging a higher rate. The table below gives the legal rate of interest in each of the states, and also the rate permitted if both parties agree. See **INTEREST**.

STATES	Legal Rate		STATES	Legal Rate	
	Per Cent	Per Cent		Per Cent	Per Cent
Alabama	8	8	Florida	8	10
Alaska	8	12	Georgia	7	8
Arizona	6	8	Idaho	6	8
Arkansas	6	10	Illinois	5	7
California	7	12	Indiana	6	8
Colorado	8	12	Iowa	6	8
Connecticut	6	12	Kansas	6	10
Delaware	6	6	Kentucky	6	6
D. of Col.	6	8	Louisiana	8	8

STATES	Legal Rate	Contract Rate	STATES	Legal Rate	Contract Rate
	Per Cent	Per Cent		Per Cent	Per Cent
Maine	6	•	Ohio	6	8
Maryland	6	6	Oklahoma	6	10
Mass	6	•	Oregon	6	10
Michigan	7	7	Penn	6	8
Minnesota	6	8	R. Island	6	•
Mississippi	6	8	S Carolina	7	8
Missouri	6	8	S Dakota	6	8
Montana	8	•	Tennessee	6	6
Nebraska	7	9	Texas	6	10
Nevada	7	•	Utah	8	12
New Hamp	6	•	Vermont	6	6
New Jersey	6	6	Virginia	6	6
New Mexico	6	10	Wash	6	12
New York	6	6	W Virginia	6	6
N Carolina	6	6	Wisconsin	6	10
N Dakota	8	8	Wyoming	7	10

*Any rate on which both parties may agree



UTAH, one of the Rocky Mountain states, originally settled by the Mormons. They called the territory which they had organized *Deseret*, a name meaning *industry* as used in the Book of Mormon. Congress, however, refused to permit the use of this name, and the territory was organized under the present name, which is the designation of the Ute, or Utah, a tribe of Indians, and means *highlanders*. Because of the presence within its borders of the extensive salt lake so widely known, Utah is popularly, though not officially, called the *Salt Lake State*.

Location and Area. The state is bounded on the north by Idaho and Wyoming, on the east by Colorado and Wyoming, on the south by Arizona and on the west by Nevada. It has straight bounding lines on all sides, and is regularly oblong in shape, except in the northeastern corner, where the southwestern corner of Wyoming cuts off several square miles.

Having an area of 84,990 square miles, the state is the tenth in the Union in size, it is only 308 square miles larger than Minnesota,

and is almost exactly twice as large as the state of Virginia.

People and Cities. The population of Utah in 1920 was 449,396. By the 1930 census, the population was 507,847, giving it the rank of fortieth in the Union in number of inhabitants. The average density was 62 to the square mile, only six other States are less densely settled. A little less than ten per cent of the whole population is foreign born, the principal nationalities being English, Danish, Swedish, Greek, German, Italian, Scotch and Norwegian. There are about 2,870 Indians on reservations, and about 1,100 negroes.

About 65 per cent of the inhabitants are adherents of the Church of Latter Day Saints (Mormon), Roman Catholics, Methodists, Presbyterians are well represented, and other sects are found in small numbers.

About 52 per cent of the inhabitants live in municipalities having 2,500 population or more. The largest cities are Salt Lake City, the capital (140,267), Ogden (40,272), and Provo (14,766).

Surface and Drainage. The surface is greatly diversified, containing high mountains, broad, arid valleys and desert plateaus. Near the middle of the northern boundary, the Wasatch Mountains enter the state and extend southward along the middle line, finally degenerating into plateaus. This is the principal mountain range of the state, and its position marks the highest land, from which, as a watershed, the streams flow eastward and westward, the former to the Colorado, the latter to sink in the Great Basin. Eastward from the Wasatch, along the northern boundary of Utah, stretches a broad, massive range, known as the Uintah.

Great Salt Lake, with its extraordinary percentage of saline matter in solution, is but the remnant of a vast body of fresh water, which once covered Western Utah. The principal stream of Eastern Utah is the Colorado. This is formed by the junction of Green River, which rises in the Wind River Mountains of Wyoming and the Grand, whose sources are in the snow fields on Long's Peak, in Colorado. The Green and the Colorado receive numerous branches from the Uintah and Wasatch ranges, among them the Uintah, the Price, the Fremont, the San Rafael and the Virgin. The scenery is varied, including fertile valleys, snow-capped mountains, the Great American Desert (an area as

large as Connecticut), deep canyons, dashing Cascades and the greatest natural bridges in the world. In the southern part are the Zion and Bryce Canyon National Parks. See **PARKS, NATIONAL**.

Climate. The mean annual temperature ranges from 48°, in the north, to 51°, in the south. The mean temperature at Frisco is 51°. The average rainfall is 16 inches. If the snow chances to fall early in the winter, it becomes compact, and the melting is retarded. A fall of snow late in the season lies loosely on the mountain sides, and the water reaches the valleys before the crops are ready to receive its full benefit.

Mineral Resources. Next to agriculture, mining is the chief industry. Utah has 210 useful minerals. Silver is found in nearly all the mountains, and Utah is second among the states in production. The gold product is over \$4,000,000. Utah ranks second in the production of copper and third in lead. Other important metals are iron and zinc. There are extensive coal fields in Emery, Carbon and Summit counties, the largest sulphur deposits in the world are in Millard and Washington counties, and a superior quality of onyx is found on the west shore of Utah Lake. Salt is mined in Juab County and is obtained from Great Salt Lake. Other mineral products are asphalt, building stone, mica, graphite and gypsum. The state also has a natural gas area.

Agriculture. The agricultural districts of the state are chiefly in the valleys immediately west of the Wasatch Mountains, in the Great Basin. Elsewhere, except in a few favored spots, the altitude or the insufficient water supply east of the Wasatch range, prevents successful farming. This vast area is used for grazing, and large herds of sheep and cattle are raised. Many sheep are exported, and the production of wool exceeded 17,000,000 pounds in 1933.

Irrigation in the Great Basin of Utah was the first important enterprise of the kind by Anglo-Saxons in the arid west. In 1847, the Mormon pioneers turned the waters of City Creek upon the parched soil of Salt Lake Valley, and now, out of 1,250,000 acres of improved land, over 1,000,000 acres are irrigated. The wheat, oats, barley, hay and rye are of superior quality, and the yield is large. In most localities the heights are too cool for successful corn-growing. Potatoes, beets and other vegetables are profitably

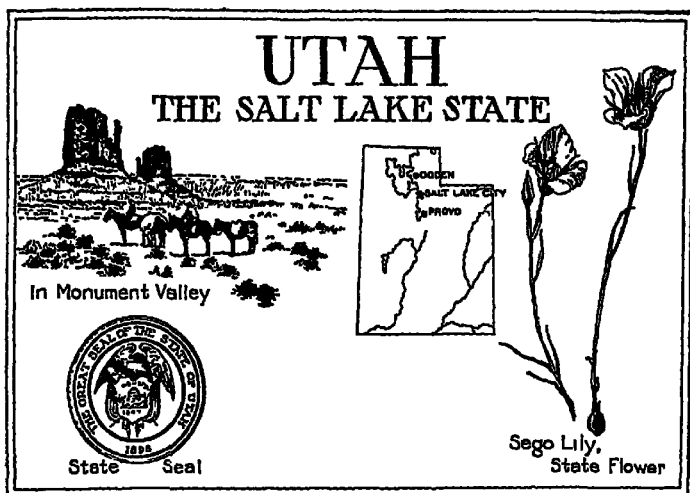
raised. Utah is the fourth state in the production of sugar beets. Fruits are abundant. Among these are apples, peaches, plums, apricots, cherries and grapes, and in the south, oranges, lemons and figs are grown.

Manufactures. Utah is rapidly forging ahead in industry, the larger cities being extensively engaged in both manufacturing and distributing activities. The industrial plants of Salt Lake City number 263. The leading manufacturing industry is the smelting and refining of copper and lead ores. Other industries, in the order of their importance, are the manufacture of beet sugar, flour and grist milling, construction and repair of railroad equipment, and preparation of salt.

Transportation. The state has railway communication with all the great cities, east and west. The principal roads are the Union Pacific, the Southern Pacific, the Denver & Rio Grande, the San Pedro, Los Angeles & Salt Lake and the Western Pacific. Short lines connect the mining towns with the principal cities. In all, the state has about 2,200 miles of railway lines. Utah has a considerable local commerce. The state exports, however, a large proportion of the products of the mines and ranges.

Government. The state senate has 23 members, the house of representatives, 60. The number of senators can never exceed thirty and the number of representatives cannot exceed three times, or fall below twice, the number of senators. Both senators and representatives are apportioned by districts, one-half of the senators being elected every two years, for a term of four years, and the representatives being elected for two years. The executive department consists of the governor, secretary of state, auditor, treasurer, attorney-general and superintendent of public instruction, elected for four years. The state courts comprise a supreme court, consisting of five judges, elected for ten years, and such inferior courts as may be established by law. The judges of the district courts are elected for four years. The state constitution provides for woman suffrage.

Education. The present educational system of Utah dates from 1890, when a superior grade of public schools was established by the legislature of the territory which superseded the more primitive pioneer educational facilities. High schools are sup-



ported in all of the larger towns and cities, and there is a state university at Salt Lake City, with which the state normal school is connected. The state agricultural college is at Logan, with experiment stations in the Saint George region and at Nephi. The Mormon Church maintains Brigham Young University at Provo, and numerous seminaries giving special religious instruction. Schools are also maintained by other denominations. Only four states show a better record for literacy than Utah.

Institutions. Penal and charitable institutions are under the control of boards appointed by the governor. They include an industrial school at Ogden, a hospital for the insane at Provo City, a school for the deaf and blind at Ogden, and a state penitentiary at Salt Lake City.

History. The first white visitors in proximity to Utah were the members of Coronado's expedition in 1540, but the territory was not settled for nearly 300 years. In 1824 Great Salt Lake was discovered by James Bridger, and soon afterwards trading posts were set up in its vicinity. The real history of Utah begins with the coming of the Mormons in 1847. In the following year the United States gained possession, under the Treaty of Guadalupe Hidalgo, and in 1849 a constitution for the "State of Deseret" was

adopted. Though Congress refused admission to the new state, it organized the Territory of Utah, including a much greater area than the state now has. Federal troops entered Utah in 1857-1858, due to misunderstandings and the inadequacy of communication facilities. Polygamy among the Mormons was viewed with disfavor by Congress, and a law making it a crime was passed in 1862, but was not seriously enforced for many years. Finally, twenty years later, the Edmunds bill, disfranchising polygamists and placing the territory under a commission of five men, was passed. Six separate efforts, between 1849 and 1887, were made to acquire statehood, but none was successful, due to objections to the existence of polygamy in the territory. The Mormon Church declared in 1890 that it no longer countenanced polygamy. Finally, in 1895, a constitution was adopted, and the state was admitted to the Union a year later.

Related Articles. Consult the following titles for additional information.

CITIES

Logan
Ogden

Provo City
Salt Lake City

PHYSICAL

Colorado River
Great Salt Lake

Utah Mountains
Utah Lake

UNCLASSIFIED

Dry Farming
Irrigation
Mormons

Polygamy
Young, Brigham

Items of Interest on Utah

The state motto of Utah is the word *Deseret*, meaning *industry*. Utah's flower emblem is the sego lily.

Some of the nation's beautiful national parks are in this state.

School attendance for thirty weeks annually is compulsory for children from eight to sixteen years, who live in large cities. Elsewhere the required attendance is for twenty weeks. There are about 650 public elementary schools and nearly fifty public high schools.

The constitution provides for the initiation of any desired legislation by the legal voters or such number of them as may be determined by law.

Among the points of scenic interest is a pulpit-shaped rock in Echo Canyon. It is said that Brigham Young preached in this pulpit his first sermon to the Mormon colonists.

In 1915 there was an uprising of the Indians on the Prute Reservation. To settle the difficulty General Hugh Scott was sent out by the government.

Four barrels of the water of Great Salt Lake will produce, after evaporation, nearly a barrel of salt.

Questions on Utah

What is peculiar about the boundaries of Utah?

Describe briefly the surface and drainage.

What artificial aids are necessary to agriculture in Utah?

What are the principal crops?

How does Utah rank as a producer of beet sugar?

How does Utah rank in the production of silver? Copper? Lead? Name two other important mineral products.

What are the principal commodities shipped to points outside the state?

What are the principal manufacturing industries?

What sensation do swimmers in Great Salt Lake experience?

In what year did the Mormons emigrate to Utah?

What can be said of the great natural bridges in the state?

UTAH, UNIVERSITY OF, a state university established at Salt Lake City in 1850, as the University of the State of Deseret. For years a weak school, it functioned feebly until 1867, owing to lack of funds. The present charter was secured in 1891, when a grant of sixty acres of land and a state appropriation of \$300,000 for buildings were made. At that time the present name was adopted. The university maintains a school of arts and science, a state school of mines and engineering, schools of education, medicine, law and commerce and finance, and the state normal school. The faculty has a membership of about 200, and the student enrollment is about 3,600. There is a library of over 120,000 volumes and 36,000 pamphlets. The legislature provides a state tax to insure a regular income.

UTAH LAKE, a fresh-water lake in the north-central part of Utah, about twenty-four miles in length and eight miles in width. It is situated in a valley bordered by mountains, and it discharges into Great Salt Lake through the Jordan River.

UTES, a tribe of Indians of the Shoshonean family, formerly scattered throughout New Mexico, Utah, Colorado and Nevada, where they carried on a relentless warfare with the Navajos. They were a restless tribe, living by hunting and fishing, but rarely engaging in agriculture. They are at present confined to an Indian reservation in Colorado, and number about 2,000.

UTICA, an ancient Phoenician city of North Africa, located on the Gulf of Tunis. Though subject to Carthage, it for a long time resisted that authority successfully, and was never contented under Carthaginian rule. In the third Punic War Utica submitted to Rome, and after the fall of Carthage was made the capital of the provinces of Africa. It was at Utica that Cato killed himself, after Caesar's victory at Thapsus. The Arabs destroyed the city in the seventh century. It was excavated by the French engineer, Daux, in 1869.

UTICA, N. Y., the county seat of Oneida County, ninety-five miles northwest of Albany, on the Mohawk River, and the Erie Canal and on the New York Central, the Delaware, Lackawanna & Western, and the New York, Ontario & Western railroads. It is the gateway to the Adirondack region and a center for tourists. It has an elevation of about 500 feet above the sea, and

is laid out with wide streets. The city is famed for its magnificent old elms. Fine state roadways radiate in all directions.

There is a large public library, besides that of the Ononda Historical Society, and law, medical, Y M C A. and Hebrew libraries. The Utica Catholic Academy, Assumption Academy, the New School and a number of other private schools are located here. An unusual number of charitable institutions have caused the place to be called the "City of Charities." They include the Saint Luke's Memorial, the Faxon and the General hospitals, a state hospital for the insane; Saint Elizabeth's Hospital and Home, the state Masonic Home and various homes for orphans, aged and homeless. The school buildings of the city are among the best in the state, and the educational standard is high. Other prominent structures are a county courthouse, two state armories, and a Federal building.

Utica has good transportation facilities, and is an important industrial center, with 300 plants. It ships large quantities of cheese and other dairy products, roses, fruit, live stock and manufactured goods. The principal manufactures are men's clothing, hosiery and knit goods, cotton and woolen goods, furnaces, machine shop and lumber products, farm implements, paints, fine extinguishers, automobile parts, cutlery and steel products.

During the French and Indian War a fort was erected on this site to control the fording place on the Mohawk. It was named in honor of Philip Schuyler. A settlement grew up and was known as Old Fort Schuyler until its incorporation as the village of Utica in 1798. The city was chartered in 1832. Population, 1920, 94,156, in 1930, 101,740, a gain of 8 per cent.

UTILITARIANISM, a term given to that system of ethics and philosophy whose fundamental principle is that the standard of right and wrong is the happiness of mankind, that is, that an act is good only to the extent that it proves itself serviceable in promoting the welfare or happiness of society. This theory is of modern origin, having been first definitely stated by John Stuart Mill and accepted by such later philosophers as Spencer and Sir Leslie Stephen. However, it is the natural outgrowth of the philosophy of such men as Hume, Locke, Bentham and Hobbes. See **PHILOSOPHY**.

UTOPIA, from a Greek word meaning *no place*, is an ideal country where all things are perfect. The term is taken from the title of a political romance written by Sir Thomas More, in 1516, describing the state of society on an imaginary island where all the property belonged to the commonwealth, to which every one contributed by his labor and from which he received his supplies. Its mild penal code was in striking contrast to that which prevailed at that period in England. The people had learned to tolerate diversity of opinion in religious matters. Promotion was according to merit, and the citizens rose through all the gradations of their existence, from form to form, as in a great public school. *Utopia* was published in Latin in 1516, and was later translated into English by Bishop Burnet. It attained a wide popularity, its name furnishing the familiar epithet *Utopian*, which is commonly applied to idealistic projects of reform in religion, government or society.

UTRECHT, *u' trecht*, **NETHERLANDS**, capital of the province of the same name, situated on the Rhine, where it branches into the Old Rhine and the canalized Vecht. It lies twenty-three miles southeast of Amsterdam, and is the chief railway center of the Netherlands. It is strongly fortified, according to belief prior to 1914, for it was the outpost of defense for Amsterdam. The University of Utrecht, dating from early in the seventeenth century, is located here. Its library contains over 250,000 volumes. The city also has a number of learned societies, a museum of paintings by the old masters and an archiepiscopal museum, which contains a collection of sacred relics. The Gothic Cathedral of Saint Martin, rising in the center of the city, is the most prominent edifice.

The principal industries are the manufacture of carpets, velvets, floor cloths, cottons, linens, cigars, chemicals, musical instruments and machinery. The trade is important. In this city, in 1579, the Union of Utrecht was formed, establishing the Dutch Republic. In 1713 the Peace of Utrecht was concluded here, terminating the War of the Spanish Succession. Population, 1933, 157,925.

UTRECHT, PEACE OF, a series of treaties agreed upon at Utrecht, between the years 1713 and 1715, by the powers that had been engaged in the War of the Spanish Succession. This was the most important political adjustment between the Peace of Westphalia

lin (1648) and the Congress of Vienna (1815)

By its provisions, Austria and Holland on the north, Prussia on the east and Savoy on the southwest were secured from French aggression. A treaty between France and England recognized the Hanoverian line of kings, engaged never to unite the crowns of France and Spain, and ceded to England Nova Scotia, Newfoundland and Hudson Bay and Strait Gibraltar and Minorca were ceded to England by Spain, which also transferred Naples, Milan, Sardinia and the Spanish Netherlands to Austria. The Dutch were allowed to garrison eight frontier towns in the Austrian Netherlands as protection against France, and were given important trade privileges. France surrendered Lorraine and certain cities on the right bank of the Rhine, retaining Alsace, with Strassburg. The Prussian king received confirmation of royal title and the Duke of Savoy was raised to princely dignity. England received trade concessions which laid the basis of a lucrative slave trade with Spanish America.

It is from the Treaty of Utrecht that England dates its commercial and colonial expansion. See *SUCCESSION WARS*, subhead *War of the Spanish Succession*.

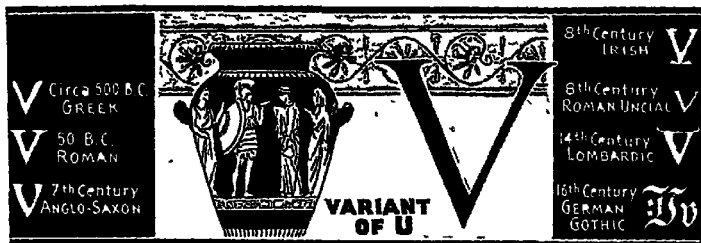
UZ, in the Old Testament, the scene of the story of Job, a region probably lying east or

southeast of Palestine, the exact location remaining undetermined.

UZBEK, a Soviet republic, since 1925 a member of the Union of Socialist Soviet Republics. It is located almost at the southwest corner of old Siberia, directly north of Afghanistan, and has an area estimated at 75,000 square miles. The most recent estimate of population is 4,447,600. Askaniya is the capital, Bokhara and Samarkand are the largest cities.

Agriculture is the principal industry, though irrigation is necessary, in this half-desert country every drop of water must be utilized. The great crop is cotton, and this product makes Uzbek of immense value to the Soviet government in Russia, for more than 40 per cent of the cotton mills of the Soviet Union draw their supplies of raw cotton from here. Uzbek also has cotton mills. There are many vineyards, industry is opening up silk culture, coal mining, and oil fields.

Uzbek has had a modern historical relation with Russia since about 1550, when Uzbekians enjoyed independence. Russian influence in time rendered it a vassal state, and under the later czars it was reduced to a deplorable condition. The country was free after the 1917 revolution, but its people soon found their future would be more secure if they joined the Soviet Union.



V, the twenty-second letter of the English alphabet, was used interchangeably with *u* in Latin, and in English until the seventeenth century. The sound of *v* is always the same, and the letter which is most closely allied to it is *f*, with which it is often interchanged in related languages. In English this close connection of the two letters is shown by the plural of such words as *wife*, *wives*, *half*, *halves*.

As a Roman numeral, **V** means five; with a line above it, it stand for 5,000.

VACATION SCHOOLS. The long summer vacation for public school pupils, especially in the congested sections of cities where there are no playgrounds, has been found to be anything but beneficial to the children. Many of the large cities now maintain schools in such centers for a portion of the vacation, and these are known as vacation schools. Some of the branches taught are the same as those in the regular course of study, but usually more time is given to industrial training and to recreation. The girls are taught sewing and cooking, the boys, woodwork or some other occupation. Some schools offer work of the regular term for pupils who failed of promotion. In schools having a large number of pupils of foreign parentage, special emphasis is placed upon English. Vacation schools are popular, and usually the number of applicants for admission far exceeds the capacity of the buildings.

VACCINATION, *vak se na'shun*, inoculation with the cowpox—a disease akin to, but much less severe than, smallpox—in order to prevent a person from catching the latter, or to make the attack much less severe. The principle upon which vaccination is based is that if one acquires the disease in a mild form, antitoxins for the cure of the disease will be manufactured in the blood and render that person immune from the attacks of

smallpox for several years. The practice of vaccination was introduced by Edward Jenner, an English physician, and it soon came into common use.

The usual method in vaccination is to make, upon the upper part of the arm, a few scratches across one another, with a clean lancet point. The virus from cowpox eruptions is then rubbed on the skin where the scratches have been made. If the vaccination proves successful, a small inflamed sore appears about the third day and increases in size until the tenth day. On the eighth day the constitutional effects manifest themselves by a slight pain in the part, headache, shivering and loss of appetite. These subside in one or two days. Afterward the fluid in the pustule dries up, and a scab forms, which disappears about the twentieth day, leaving a scar in the skin. Few things have been more definitely proved in medicine than that vaccination is a preventive of smallpox. To secure perfect immunity, repeated vaccinations at intervals of several years are necessary in most cases.

There is no danger in vaccination if pure virus is used and if the wound is kept free from infection. The wise plan is to have the vaccination made by a good physician, who will treat the wound properly and prevent any injurious results.

VACCINE THERAPY, *vak'seen ther'a pi*, a method of medical treatment for combating diseases caused by bacteria. The treatment is based upon the principle that injection into the system of killed bacteria that produce the disease will develop in the blood another sort of bacteria that will destroy the disease-producing bacteria. The vaccines are usually prepared by placing some fluid of the body containing the disease-producing bacteria in some substance in which the bacteria will grow rapidly, then purifying this "cul-

ture" and treating it with a preservative. The vaccine is injected hypodermically, and works in a few hours. This method of treatment is successful in such diseases as carbuncle, ulcers, typhoid fever, tuberculosis and asthma. See **SERUM THERAPY**.

VACUUM, a term usually applied to a space from which air or other gases have been exhausted. An absolute vacuum is impossible, since however completely the gases may be exhausted, the space will still be filled with ether (see **ETHER**). However, in the ordinary use of the term, a vacuum is said to be produced when the air is removed from space as completely as possible by means of an air pump. Such vacuums are sufficiently perfect for common experiments. The most perfect vacuum formed in practice is that above the mercury in a barometer tube, produced by filling the tube with mercury and allowing it to settle until the column sustained is equal to the weight of an equal column of atmosphere (see **BAROMETER**). Other practical applications of the vacuum are found in the vacuum brake and the vacuum pen. See **AIR BRAKE**, **VACUUM PEN**.

VACUUM CLEANER, a device for removing dust from floors, walls and hangings by means of rolling brushes and air suction. Small cleaners propelled by hand or capable of being attached for power to electric sockets are in use in individual households. For larger buildings an air pump mounted on a truck and run by a gasoline engine may go from door to door, carrying the dust to a box in the truck by means of a large hose. Office buildings are commonly equipped with stationary engines, run by gasoline or electricity and operating a pump connected with a system of pipes leading to the different floors.

The use of the vacuum cleaner is a distinct advance in the matter of sanitation, as the former method of sweeping with brooms scattered the dust and was a means of spreading contagion.

VALDAI, *val' d'ē*, **HILLS**, a group of hills in West Central Russia, forming the chief watershed of that part of Europe. They consist of hills and plateaus, with an average altitude of from 8,000 to 9,000 feet. Formerly covered with forests, they are now cleared and cultivated. They contain the sources of the Volga, the Dnieper and the Duna.

VALENCIA, *val'en'she ah*, **SPAIN**, the third city in population in the country, situ-

ated on the Guadalquivir River, three miles from the Mediterranean. Its history dates to 138 B. C. It was destroyed by Pompey of Rome, and was captured by the Visigoths in 418 and by the Moors in 714. From 1021 to 1238 it was the capital of an independent Moorish kingdom. In its modern aspect it is a picturesque mixture of Moorish architecture and modern streets and plazas. The University of Valencia, founded in 1411, is one of the foremost in Spain. The harbor is secure and well equipped to accommodate commerce and the city is an important railway center. The leading industry is the manufacture of silk, and the place is also noted for the making of colored tiles. Fruit raising is extensively carried on in the surrounding country. Population, 1934, 341,322.

VALENS (328-378), Roman emperor of the East, associated in power with his brother Valentinian I. The chief event of Valens' reign was a war with the Goths, who, driven southward by the Huns, had received permission to settle on Roman territory. Irritated, however, by the treatment they received at the hands of the Roman officials, they soon took up arms and destroyed Valens and the greater part of his army.

VALENTINE, **SAINTE**, a saint of the Roman calendar, said to have been martyred in A. D. 306. The custom of choosing valentines on his day (February 14) has been accidentally associated with his name. On the eve of Saint Valentine's day, young people of both sexes used to meet, and each of the men drew from a number of names of the opposite sex. Each gentleman thus got a lady for his valentine, and he became the valentine of a lady, to whom he was bound to be faithful for a year. A similar custom prevailed in the Roman Lupercalia, to which the modern custom has, with probability, been traced. The day is now celebrated by sending through the post, sentimental or ludicrous missives, specially prepared for the purpose.

VALENTINIAN I (321-375), on the death of Jovian, in 364, chosen emperor of Rome by the army, therefore one of the "barracks emperors." He shared the empire with his brother Valens, who ruled in the East. Although chiefly occupied throughout his reign in repelling invasions of the barbarians, he proved himself a firm and just ruler, instituting many political and social reforms. His sons, Gratianus and Valentinian II, succeeded him.

VALENTINIAN III, Roman emperor from 425 to 455. He was made emperor by Theodosius II, his grandfather, but never really exercised the imperial power, leaving it in the hands of his mother, Placidia, until her death in 450, and then largely in the hands of the eunuch Hierocles. Although the barbarians who were constantly harassing the empire were repeatedly defeated by Aetius, general of the army, Spain, Africa, Gaul and other provinces were lost to Rome during Valentinian's reign, and the empire grew steadily weaker. Valentinian was assassinated.

VALERIAN, a medicinal plant, native to Europe and Northern Asia, growing abundantly by the sides of rivers and in ditches and moist weeds. The aromatic, volatile oil obtained from its roots is used as a stimulant in the treatment of nervous and circulatory disorders.

VALHALLA, in Old Norse mythology, the palace of immortality, inhabited by the souls of heroes slain in battle, and carried thither by the swift Valkyries. Here they spent their time in drinking and feasting and fighting furious battles, their wounds, though often serious, were healed every night. The name Valhalla is applied figuratively to any edifice which is the final resting place of many heroes. See **VALKYRIES**.

VALKYRIES, *val'kī'ez*, in Old Norse mythology, the maiden attendants of Odin, who, at his command, rode over battlefields and bore the souls of the bravest of the slain to Valhalla, Odin's great hall. Here the Valkyries waited upon the heroes, serving them mead in vessels made from skulls. The Valkyries were sometimes regarded as the personification of clouds, especially of storm clouds. See **VALHALLA**.

VALLADOLID, *vahl'ya do leed'*, Mexico. See **MORELIA**, Mexico.

VALLEJO, *val'yə'ho*, CALIF., a city of Solano County, situated on the northeastern shore of San Pablo Bay, twenty-three miles northeast of San Francisco, on the Southern Pacific railroad. It has a fine, deep harbor, which admits the largest ocean ships, and is an important shipping point for grain. Its leading establishment is the Mare Island Navy Yard. There are also flour mills and tanning yards. The city is built on the slopes of a hill, and the surrounding country is devoted to the raising of fruit. The public institutions include an orphans' home, Saint

Vincent's Academy, a sailors' clubhouse, a Carnegie Library and a city hall. The city was founded in 1851 with the intention of making it the capital of the state. The legislature met here in 1851, in 1852 and for a time in 1853. The commission form of government was adopted in 1911. Population, 1920, 16,845, in 1930, 14,476, a decrease of 14 per cent.

VAL'LEY, low land between mountains, hills or bluffs. The largest and most important valleys have been formed by the upheaval and folding of the earth's crust. Such valleys are found among mountain systems, and are called *intermontane* valleys. They are long and narrow, and their floor may have an elevation several hundred or several thousand feet above the sea level. The simplest valleys of this sort are found in the Jura Mountains, where the strata were not broken in folding and where the slopes are remarkably uniform and even. Many of the so-called basins in the Rocky Mountain plateau are also valleys formed by the folding of strata, but most of these are irregular and are caused by transverse ranges, show-



A VALKYRIE

ing that the movements by which they were formed were very complex.

Valleys running parallel to the mountain ranges are known as *longitudinal* valleys, those running across the ranges are *trans-*

verse valleys Transverse valleys may be due to breaks in the folded strata, but most of them have been formed by erosion. They are usually narrow, with very steep sides, and the floor is only wide enough for the stream which flows in it. When of high altitude these valleys are known as *passes*. Among the most celebrated of these passes are the Khyber Pass in the Himalayas and the Simplon Pass. When of low altitude, transverse valleys are frequently known as *water gaps*, as the Delaware Water Gap.

Valleys in volcanic regions are usually due to volcanic action and are found in the side or on the summit of mountains, around the crater. They are small and of comparatively little importance. River valleys are formed by erosion, but their location was first determined by the formation of mountains and valleys by folding. Glacial valleys are those which have been formed or modified by the action of glaciers. They are found in mountainous regions, and most of them were undoubtedly river gorges, previous to the glacial period. The lochs and firths of Scotland are good illustrations.

Drowned valleys are those partially under the sea, and are formed by the lowering of the coast. The fjords of Norway, Delaware Bay and the Gulf of Saint Lawrence are good examples.

Related Articles. Consult the following titles for additional information:
Canyon Glaciers
Fjord Mountain

VALLEYFIELD, Que., on the Canadian National and the Saint Lawrence & Adirondacks railways, is the western terminus of the Beauharnois Canal. The town has large cotton and flour mills, paper, biscuit, gasoline motor, glove, clothing and cigar factories. It is the seat of a Roman Catholic bishop. Considerable lumbering and iron mining are done in the vicinity. Population, 1931, 11,411.

VALLEY FORGE, a village in Chester County, Pa., famous as the site of the quarters of the American colonial army under George Washington in the winter of 1777 and 1778. The army was 11,000 strong when it went into camp, December 17, but owing to mismanagement on the part of the quartermaster-general and the commissary department the supplies were totally inadequate, and fully half the men were soon unfit for duty. The suffering of the soldiers during the winter and following spring was almost incredible and tried the patriotism of even the most loyal

friends of the colonial cause. Washington remained with his men throughout this period and with the aid of Baron Steuben finally



WASHINGTON'S HEADQUARTERS AT
VALLEY FORGE

succeeded in bringing the army to a high state of efficiency. Camp was broken June 18, 1778. The site is now partially included in a tract preserved by the state and known as Valley Forge Park.

VALOIS, *val wah'*, a dynasty ruling in France from 1328 to 1589, having its origin in the circumstances by which Philip III, in 1285, gave the county of Valois to his younger son, Charles. Upon the extinction of the Capet dynasty, in 1328, the eldest son of this Charles of Valois ascended the French throne as Philip VI. The elevation of the House of Valois to the throne of France gave rise to the series of long and bloody conflicts with England known as the Hundred Years' War.

VALPARAISO, *val pa'ri'so*, CHILE, the capital of the province of Valparaiso and the chief port of the country, situated on the Pacific Ocean, sixty-eight miles northwest of Santiago. It has a commodious harbor, protected by a newly-constructed breakwater, and is connected by regular lines of steamers with leading American and European ports. It is strongly fortified, and has a large naval arsenal.

Back of the harbor rise hills and mountains, on the lower slopes of which is the newer residence portion of the city. The lower town contains the business section and city park. The buildings are mostly constructed of stone and are of a substantial character. The educational institutions include a naval school, a number of colleges and a school for marines. The city maintains a hydrographic bureau and a museum of natural history. The industrial establishments include foundries, machine shops, bottling works, distilleries, sugar refineries and rail-

road shops The principal exports are grain, wool, leather, guano, saltpetre and copper, the imports are textile and other manufactured and mineral products

Valparaiso was founded by Juan de Saavedra in 1536 It has been visited by several disastrous earthquakes, the latest being that of August 16 and 17, 1906 Population, 1932, 189,119

VALPARAISO UNIVERSITY, an educational institution at Valparaiso, Ind., founded in 1873, for the purpose of providing college advantages for students of limited means Since 1925 it has been under the control and management of the Lutheran University Association

Students with acceptable scholastic records from recognized secondary schools are admitted on certificate Degrees are given in four major departments of the University—Liberal Arts, Engineering, Pharmacy, and Law It also maintains courses in Business Management and Economics and in Music The average student attendance is 800, and the faculty numbers about 60 The library contains 18,000 volumes

VALUE See SUPPLY AND DEMAND

VALVE, a device, as a cap, ball or slide, for the purpose of controlling the flow of liquids, steam, gas or loose material through pipes, tubes or chutes As to the method of their operation, most valves may be included in this general classification (1) valves opened and closed by hand, (2) those operated by independent mechanism, (3) those operated by mechanisms connected with the machine whose operation they control, and (4) those opened and closed by the motion of the fluid whose flow they control Valves may rotate, rise and fall from their seats or open and close by sliding on and parallel to their seats In the human anatomy the loose flap or fold of lining membrane which regulates the flow of the blood and other bodily fluids is called a valve See PUMP, STEAM ENGINE

VAMPIRE, in Slavic folklore, a corpse which leaves its grave during the night and sucks the blood of living human beings, particularly of young people and children The victims gradually lose strength and finally die from no apparent malady, while the corpse retains the appearance of a living being The belief in vampires is an ancient one, fostered by the medieval Greek church as a means of terrifying the people into

godly behavior It still persists in the locality of the lower Danube, where heretics, outcasts and criminals are still supposed to become vampires at death

Figuratively, a vampire is a person who in any way preys on another. Kipling's poem, *The Vampire*, characterizes the parasitic woman

VAMPIRE BAT, a Central and South American bat which takes its name from the habit of some of the species of sucking the blood of the cows, horses, and even men, attacking them in their sleep These bats are of small size, are tailless, and have a pair of upper incisors elongated and sharpened to pierce the skin of their victims They have gullets so small that only a liquid diet is possible, and the intestinal canal is modified to accommodate a diet of blood The destructive qualities of these bats, however, have been greatly exaggerated

VANADIUM, a silvery-white metallic element, extracted by difficult processes from a number of minerals It is of value as an alloy in the manufacture of steel, especially that used in automobile construction, because it increases elasticity and tensile strength Certain vanadium salts yield compounds that produce intense, permanently black pigments that are combined with ammonia in the manufacture of dyes and also as the base of black writing fluids

VAN BUREN, MARTIN (1782-1862), an American statesman, eighth President of the United States He was the close friend and the successor of Andrew Jackson, to whom he owed his nomination by the Democrats Van Buren was totally unlike his imperious, outspoken predecessor He was slight of figure, courteous, mellow-voiced and soft-spoken, yet beneath his placidity of

manner there lay individuality, a firm will and strength of character Tactful and conciliating as he was, Van Buren could fight doggedly for principle, and notwithstanding his strong sense of party loyalty, he could break with his party when his conscience so dictated His administration is noteworthy chiefly for the establishment of the independent-



Grave at
Kinderhook,
New York

ent treasury system, the result of his own tireless efforts. At the time he gained little credit for this achievement, but historians of to-day find thus the outstanding feature of his career as President.

Early Life. Martin Van Buren was born at Kinderhook, Columbia County, New York, on December 5, 1782. He was the son of a small farmer. He attended the local schools until he was fourteen, after which he became office boy for a neighborhood lawyer, rising to the positions of clerk, copyist of pleas and special pleader in the constables' courts. After six years of such training he entered a New York law office, and in 1803 was admitted to the bar. He then entered into a partnership with his half brother, James Van Allen, in Kinderhook, where he was soon a conspicuous figure in local Democratic (then called Democratic-Republican) politics. Within the next few years Van Buren advanced rapidly in his profession, becoming probate judge in Columbia County, in 1808, and holding that position until 1813.

Political Advancement. In 1812 Van Buren was elected to the state senate of New York, and in 1815, while still a member of that body, was appointed attorney-general. He was reelected to the senate for the term 1816-1820, but lost his position as attorney-general in 1819 because of a political disagreement with Governor De Witt Clinton. Throughout this period he was steadily gaining in power of leadership, and in 1820 was successful in securing the reelection of Rufus King to the United States Senate. The following year he himself won a seat in that body.

Van Buren remained in the Senate until 1823, when he was elected governor of New York. In the Senate he had favored strict construction of the Constitution on all questions, and as a member of the finance committee and chairman of the judiciary committee he had made a good impression by his sincerity and moderation. His career as governor is of special interest to-day, in that he advocated two principles whose wisdom is more appreciated at present than in his time. In the first place he opposed free banking, and advocated a system whereby all the state banks would become "mutual insurers of each other's soundness." This plan is a feature of the present Federal Reserve system. Secondly, he recommended that state and national elections be separated.

While this principle has not been extensively adopted, its soundness is generally accepted.

In the Presidential election of 1823, Van Buren effectively supported Andrew Jackson, whom he warmly admired, and in 1829 the latter rewarded him with the most important place in his first Cabinet, that of Secretary of State. Van Buren retained this office long enough to settle a disagreement between England and the United States with respect to the trade of the West Indies.

He resigned in 1831 and soon accepted the post of minister to England, but as a bit of party politics the Senate Whigs succeeded in holding up the nomination after the appointee had sailed. It was known in political circles that Van Buren had resigned in order not to jeopardize his chances for the Presidential nomination in 1836, to which he was looking forward. The Whigs hoped to discredit him by their maneuver, but the pretext which they used was so feeble that their act served only to increase Van Buren's popularity. In 1832 he was elected Vice-President on the ticket with Jackson, and was in line for the nomination for President on the expiration of Jackson's second term. The Whigs were badly split, and in the electoral college in 1836 the party vote was divided among William Henry Harrison, Hugh L. White of Tennessee, Daniel Webster and W. P. Mangum of South Carolina. Van Buren had 170 votes against seventy-three for his nearest rival, Harrison.

Administration. The new President fell heir to a legacy of financial chaos, and his whole administration was clouded by that issue.

President Jackson, in 1833, had removed the funds of the government from the United States Bank, practically putting an end to the institution, which he regarded as a symbol of the "money power." The funds had been distributed among certain "pet banks," which used them in unsound speculation. Subsequently, Jackson issued a "specie circular" requiring that gold and



MARTIN VAN BUREN

Administration of Martin Van Buren, 1837-1841

I THE PRESIDENT

- (1) Birth
- (2) Education
- (3) Early career
- (4) Later life
- (5) Character
- (6) Death

- (e) Anti-rent or "patroon" war
- (d) Canadian rebellion
 - (1) Attempts to enlist American aid
- (2) Strict neutrality of the United States
- (3) The Caroline affair

II THE PANIC OF 1837

- (1) Causes
 - (a) Over-speculation in land
 - (b) Expenditures for internal improvements
 - (c) Panic in England
 - (d) Failure of the wheat crop
 - (e) Wild-cat banking
- (2) Effects
 - (a) High prices of necessities
 - (b) Bank and brokerage failures
 - (c) Business failures
 - (d) Distress among the poor
 - (e) Suspension of specie payments
- (3) Led to independent treasury

- (6) Great inventions and discoveries
 - (a) Friction matches, 1838
 - (b) Magnetic telegraph
 - (c) First photograph taken
 - (d) Vulcanized rubber

IV QUARREL WITH MEXICO

- (1) Causes
 - (a) Property of Americans in danger
 - (b) United States vessels seized
 - (c) United States citizens imprisoned and executed
- (2) Mexico resented recognition of Texan independence

V ELECTION OF 1840

- (1) Issues
- (2) Candidates

III DOMESTIC AFFAIRS

- (1) Slavery agitation
 - (a) Riots and demonstrations
 - (1) Murder of Lovejoy
 - (2) Garrison mobbed in Boston
- (2) Second Seminole War
 - (a) Skirmishes and raids
 - (b) Capture of Osceola and other chiefs
 - (c) Zachary Taylor's force defeats Indians at Okechobee swamp
- (3) Oregon settlements
 - (a) Mostly by Hudson Bay Company
 - (b) Americans were missionaries
- (4) The Mormons in Missouri
 - (a) Control of the government by the Mormon church
 - (b) Troubles at Kirtland
 - (c) Driven out of Missouri
- (5) Riots and disorder
 - (a) The "buckshot" war
 - (b) The "broad seal" war

Questions on Van Buren

When was Martin Van Buren born? In what state?

What profession did he adopt?

What public offices did he hold before 1837?

What can you say of his abilities and character?

What were the principal causes of the panic of 1837? Give details of each as far as you can

What were some of the immediate effects of the panic?

What is meant by the independent treasury or subtreasury system?

Who was Elijah Lovejoy? Where did he live?

Give a brief summary of the career of William Lloyd Garrison

What future President took a prominent part in the second Seminole War?

Who was the founder of the Mormon sect?

Name three inventions perfected during Van Buren's administration

WALKER'S ADMINISTRATION

1837-1841.

FIRST PHOTOGRAPH
TAKEN BY AMERICAN
1839.



THE
SEMINOLE
WAR.



CRUCIFIC POPULATION,
1840-1846

SUBTERRANEAN ALLIANCE
1846

FIRST HUMAN SCHOOL
OPENED IN MASS.
1843

THE GREAT
FINANCIAL PANIC
"OF 1837"
THE
SUBTERRANEAN SYSTEM
ESTABLISHED.

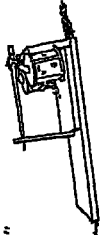
PROCESS OF
FABRICATING RUBBER
DISCOVERED IN
1831

CHEROKEE INDIANS
REMOVED TO INDIAN TERRITORY
1838

THE
CHILDREN REBELLION
1837

THE ALTON RIOTS
1838

MAGNETIC TELEGRAPH
PATENTED 1844



FRICITION MATCHES
FIRST USED IN 1841.



VICTORIA CROWNED

silver be paid for public lands, which drained the banks of their reserves and caused many failures. It was a period of credit inflation, reckless issuance of paper money and extravagant expenditures for public improvements, and in 1837, shortly after Van Buren began his term, a disastrous panic overwhelmed the nation.

The President called Congress in special session, and in his first message, September 1, 1837, outlined his policy. After explaining the causes of the panic, he presented his plan for an independent treasury, whereby the control of national finances would be divorced from private banking and the government would be the custodian of its own funds, as it is to-day. For three years he labored to have this policy adopted, not until July, 1840, did he succeed in persuading a reluctant Congress to pass the law which he regarded as a sort of "second Declaration of Independence." Except for a short interval under the Whig régime, the independent treasury has remained a permanent national institution.

Though the financial issue overshadowed all others, it is not true that Van Buren's term was in other respects uneventful. The slavery issue, becoming yearly more entangled with politics, was the cause of such disturbances as the murder of Elijah Lovejoy at Alton, Ill., and the mobbing of the great abolitionist, William Lloyd Garrison. There were outbreaks in New York against the landlords, or patroons, and in Missouri against the Mormons, in Florida a desperate war with the Seminoles was waged. A rebellion in Canada and the establishment of the republic of Texas caused disturbances along the international boundaries, north and south.

Van Buren was not responsible for these conditions, but they reacted against him, and with the prevalent hard times served to make his administration and the Democratic party extremely unpopular. He also alienated many voters by refusing to aid the Canadian rebels, though time has vindicated his attitude of strict neutrality. Considerable material progress is recorded of the period. In 1837 the magnetic telegraph was invented; friction matches were first used in 1838, in 1839 the first photograph was taken in America. In 1839, too, the process of vulcanizing rubber was invented by Charles Goodyear.

Van Buren was a candidate for reelection,

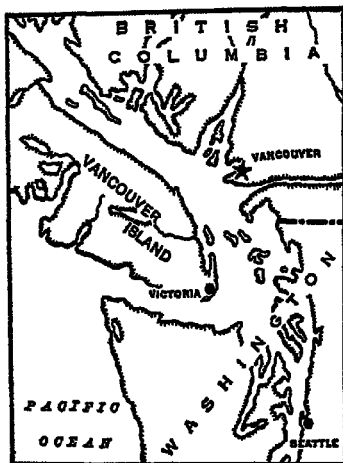
but his administration was connected with too much that was disagreeable, and he was defeated. He secured but sixty electoral votes, to 234 for the Whig candidate, William Henry Harrison. Calmly accepting his defeat, he retired to his country seat of Lindenwald in his native county.

As Ex-President Van Buren by no means disappeared from the public eye during the last two decades of his life. In 1844 he took a firm stand against the annexation of Texas, thus losing the Democratic nomination for the Presidency, and within the next three years he came out definitely against the extension of slavery. In 1848 the faction of the Democratic party which upheld the Wilmot Proviso (which see) nominated him, against his wishes, for the Presidency, and the nomination was confirmed by a convention of "Free-Soilers." The regular Democrats nominated Lewis Cass, from whom Van Buren pulled enough votes to give the election to Zachary Taylor. Van Buren received about 300,000 popular votes, but he carried no state. He remained a Democrat to the end of his life, but his sympathy for the anti-slavery cause made him a firm supporter of Lincoln after the outbreak of the Civil War. He died in the second year of the struggle, and was buried at Kinderhook, N. Y.

Related Articles titles for additional Garrison, William Lloyd Lovejoy, Elijah P. Political Parties in the United States	Consult the following information Seminoles Texas (history) Treasury Department
--	---

VANCOUVER, *van loo'v'er*, B. C., the third largest city of Canada and the metropolis of the province, is situated on Burrard Inlet, an arm of the Strait of Georgia. Vancouver is the western terminus of the Canadian Pacific Railway, and it was laid out by that railway corporation in 1885. It is now also the terminus of two other great trans-continental railway systems, the Canadian National Railways, and the Pacific Great Eastern. It is also the western terminus of the British Columbia Electric Railway, which extends to Chilliwack and New Westminster. The city is on one of the best harbors in the world, and has regular steamship connection with China, Japan and other ports of the Orient. It also has a coastwise trade with Alaska and the Pacific ports of the United States.

The prominent buildings include the Vancouver Block, the Standard Bank Building, Rogers Building, Vancouver Hotel, the custom-house, public library and courthouse. The University of British Columbia, the leading



VANCOUVER ISLAND AND CITY

educational institution of the province, is located here. Stanley Park, having an area of 600 acres, mostly in the natural state, adds much to the beauty of the city.

Vancouver is next to Prince Rupert the nearest North American port to the Orient, and it has a large export trade exceeding \$100,000,000 a year. It is also an important manufacturing center. The principal manufactures include lumber and lumber products, structural steel, wooden and steel ships, furniture, machinery and refined sugar. Population, 1931, 246,593.

VANCOUVER, GEORGE (1758-1798), an explorer and discoverer. He accompanied Cook on several of his voyages, and later was in command of an expedition to explore Australia and New Zealand. From there he sailed by way of the Hawaiian Islands to North America, where he surveyed, in a period of two years, the coast from 35° to 56° North latitude. Vancouver Island was named after him. He sailed for England via Cape Horn and Saint Helena, and died shortly after his arrival at his home in Surrey.

VANCOUVER, WASH., the county seat of Clarke County, five miles north of Portland, Ore., on the Columbia River and on the Northern Pacific, the Great Northern, Union Pacific, and the Spokane, Portland & Seattle railroads. There are two airports, one a Federal field. It is the United States military headquarters for the department of Columbia. Vancouver lies in a section of large forests and farming lands. The leading industrial plants include a paper mill, flour mills, an ice plant, creameries, canneries, car-repair shops, brickyards, box factories and fruit-packing plants. The state schools for the blind and the deaf and Saint Joseph's Hospital are located here. Notable buildings are a Carnegie Library, the United States National Bank Building, and a courthouse and postoffice. An Interstate bridge spans the Columbia River at this point. Vancouver was first settled as a post of the Hudson's Bay Company in 1828, and was incorporated as a city in 1858. Population, 1920, 12,637, in 1930, 15,766, a gain of 25 per cent.

VANCOUVER ISLAND, an island in the Pacific Ocean, off the coast of British Columbia, of which it is politically a part. It is separated from the mainland of Canada by the Gulf of Georgia and Queen Charlotte Sound and from the United States by the Strait of Juan de Fuca. Its length is 275 miles; its greatest breadth, sixty-five miles, and its area, about 12,000 square miles. The island is generally mountainous, being a continuation of the Coast Ranges formation. It has a mild, moist climate, and in the south and east its soil is fertile and well suited to agriculture and fruit growing. The mountains are generally covered with heavy coniferous and deciduous forests. The interior is well adapted to grazing, and large numbers of horses, cattle, sheep and swine are raised. Fishing interests along the shores of the streams and lakes are of considerable importance. Mineral resources include coal, gold and copper. The coal mines are extensively worked and supply the greater part of the coal used on the Pacific coast. The chief town is Victoria, the capital of British Columbia. The island was visited by Vancouver, an officer of the British navy, in 1792, and was named for him. The United States claimed it, but when the Oregon boundary question was settled in 1846, it became a possession of Great Britain.

VANDALS, an ancient Teutonic people, inhabiting the region between the Vistula and the Oder, whence they moved southward and settled in Pannonia, becoming Christians of the Arian faith. At the beginning of the fifth century they entered Gaul and crossed the Pyrenees into Spain. One section settled in Galicia and were almost entirely destroyed in a struggle with the Goths and Suevi, the other settled in a part of Baetica, which received from them the name *Andalusia*. In 429 they crossed the Strait of Gibraltar, under their dreaded leader, Genseric, carrying devastation and ruin from the shores of the Atlantic to the frontiers of Cyrene. In 455 Genseric and his soldiers sacked Rome, plundering and burning temples, beautiful buildings and works of art. The word *vandal* is still applied to persons who are wilfully destructive.

VANDERBILT, CORNELIUS (1794-1877), American capitalist and financier, born on Staten Island, N. Y.

At the age of sixteen he bought a boat and ferried passengers and goods across to the city. Gradually extending his enterprise, by the age of forty he had become the owner of a fleet of sound and river steamers running to Boston and up the Hudson. In 1849 he founded a steamship and transfer line by way of Lake Nicaragua to California, and during the Crimean War he established a line of ocean steamships to Havre. Because of the large fleet of boats he owned he was popularly known as "Commodore." Later he transferred his capital from steamships to railroads, obtaining a controlling interest in a large number of Eastern roads, and extending his system to Chicago by securing the Lake Shore & Michigan Southern, the Canada Southern and Michigan Central roads. At his death he left a fortune of \$100,000,000 to his son, William Henry Vanderbilt. His philanthropies included a gift of a million dollars for the founding of Vanderbilt University.

VANDERBILT, CORNELIUS (1843-1899), son of William Henry Vanderbilt, made first vice-president of the New York Central Rail-



CORNELIUS
VANDERBILT

road when his father succeeded to its presidency, on the death of his grandfather, Cornelius Vanderbilt, in 1877. He subsequently held directorships in more than thirty different railroad companies. He was a contributor to many educational institutions, including Vanderbilt and Yale Universities. The prized treasure of the Metropolitan Museum, New York, Rosa Bonheur's *Horse Fair*, was the gift of Cornelius Vanderbilt.

VANDERBILT, WILLIAM HENRY (1821-1885), son of "Commodore" Vanderbilt and his successor in the management of the Vanderbilt system of railroads, which he extended till he controlled the Michigan Central, the Lake Shore & Michigan Southern, the Canada Southern, the Chicago & North Western, the Nickel Plate and the West Shore railroad. He was considered one of the greatest authorities on transportation of his day. He gave large sums to Vanderbilt University and Columbia University.

VANDERBILT, WILLIAM KISSAM (1849-1920), son of William Henry Vanderbilt, entrusted by his father with the management of numerous responsible offices connected with the New York Central Railroad and a director in fourteen different lines. With his brother, Frederick William and George Washington Vanderbilt, he founded the Vanderbilt Clinic in New York City, and erected Kissam Hall at Vanderbilt University, in memory of their mother.

VANDERBILT UNIVERSITY, a coeducational institution, established at Nashville, Tenn., in 1872, under the auspices of the Methodist Episcopal Church, and named in honor of Cornelius Vanderbilt, who gave \$1,000,000 for the purpose of establishing the school. According to its present organization, however, the university is not under sectarian management. There are maintained a college of arts and sciences, and schools of law, religion, medicine, dentistry, pharmacy and engineering. Vanderbilt University has been a strong influence in the South in keeping educational standards high. It has a student enrollment of over 1,600 and a faculty of about 300. There are 125,000 volumes in the library. The university has received generous gifts from the Vanderbilt family and from Andrew Carnegie.

VAN DYCK, or VANDYKE, van dyle, ANTHONY, SIR (1599-1641), next to Rubens his teacher, the most famous portrait painter of the Flemish school. He was born at Ant-

werp, where his father was a merchant and his mother a skilled worker in tapestry. He studied under Van Balen and Rubens and also in Genoa, Venice and Rome. Having acquired a great reputation in Antwerp as a fashionable portrait painter, he was invited to England by Charles I, who bestowed upon him knighthood and a considerable annuity. While in England he painted more than 300 portraits, his patrons including almost every distinguished person of the court. His portraits are characterized by debauchery and refinement. Those best known are *Portrait of Charles I and Children of Charles I* and the *Portrait of a Lady and Child*. He also painted a number of historical and mythological subjects, and his *Elevation of the Cross* and *Crucifixion* are well known. He married Mary Ruthven of the English nobility, and lies buried in Saint Paul's, London.

VAN DYKE, HENRY (1852-1933), American poet, essayist and educator. He was born at Germantown, Pa., and graduated at Princeton and at Princeton Theological Seminary. In 1878 he became pastor of the United Congregational Church of Newport, R. I., and five years later was called to the Brick Presbyterian Church of New York. Here he re-



HENRY VAN DYKE

mained as pastor until 1900, when he became professor of English literature in Princeton University. Van Dyke has written extensively, and always attractively, in various fields. *The Builders and Other Poems and Music and Other Poems* are among his volumes of poetry. *The Gospel for an Age of Doubt* and *Sermons to Young Men* are examples of his religious work; *The Blue Flower* and *The Ruling Passion* are some of his charming works of fiction, and *Fisherman's Luck* and *Little Rivers* include his best work in the field of essays. In 1913 Dr. Van Dyke was appointed minister to the Netherlands by President Wilson, a position which he held with honor throughout the greater part of the World War. This post he resigned in 1917 before the United States entered the war. After America became a belligerent he was appointed supervisory chaplain in the navy.

VAN HISE, CHARLES RICHARD (1857-1918), an American geologist and educator, born at Fulton, Wisconsin, educated in the University of Wisconsin. Soon after graduation he became connected with the faculty of his alma mater, serving successively as instructor in chemistry, assistant professor of mineralogy, professor of geology and president of the university, to which position he was elevated in 1903. Under his administration the institution became one of the most progressive and useful schools in the United States. He was particularly effective in making extension courses available to all classes of people throughout the state.

Professor Van Hise was made a member of the United States Geological Survey in 1883. He won recognition as the highest authority on rocks of the Algonkian and Archaean Systems and especially on the ore-bearing rocks of the Lake Superior region. He was the author of a series of books on geological subjects and of *The Conservation of Natural Resources in the United States*.

VAN HORNE, WILLIAM CORNELIUS, SIR (1843-1915), railway official and expert, best known for his connection with the Canadian Pacific Railway, which was completed under his energetic and efficient management. He served that railway from 1882 to 1910 as general manager, vice-president, president and chairman of the board of directors, successively. Van Horne was born in the United States and served several mid-western railroads in that country before being called to Canada.

VANILLA, a genus of plants belonging to the orchid family, source of the well-known vanilla of commerce. The plants are common in Mexico, and are also found in Central and South America and the East Indies. The vanilla plant climbs by means of aerial roots and has large white, red or greenish flowers. The fruit is a long, brown, shiny bean, filled with a dark, oily, odoriferous pulp. This bean is gathered before it is fully ripe, and the oil is extracted by a slow process which brings out its peculiar odor and flavor. Vanilla is used in medicine as a



VANILLA

stimulant, but its chief use is in the preparation of liquors and perfumery and in flavoring candy and other confections. The vanilla plant is propagated by cuttings, produces a crop every three years and continues bearing for thirty or forty years. Vanilla is produced artificially by several methods, the artificial product is very common.

VAN LOON, HENDRIK WILLEM (1832-) Born in Rotterdam, Holland, and educated in universities in Europe and America, he became a reporter, editor, professor of history, then one of the most notable authors of his generation. Van Loon came to public attention when he published *The Story of Mankind*, he wrote it in 1921 solely for his son, but was induced to publish it. Another volume, *Van Loon's Geography*, proved equally popular. *The Story of the Bible*, *Ancient Man*, *America*, *The Fall of the Dutch Republic*, *The Rise of the Dutch Kingdom*, *A Short History of Discovery*, *Tolerance*, *Ships and How They Sailed the Seven Seas*, and *Air-Storming* followed. He illustrates his works with his own pen-drawings.

VAPOR, in physics, the gaseous state into which solids and liquids pass when heated. In their structure and physical properties, there is practically no difference between vapors and gases (see *Gas*), but in ordinary usage the term *vapor* is applied to those gases that are formed by the action of heat on liquids and solids, while the term *gas* is applied to those substances which remain in gaseous form under ordinary conditions of temperature and pressure. We speak of steam as a vapor and of oxygen as a gas. Water vapor formed by the action of the heat of the sun on the surface of the land is always present in the atmosphere and has an important effect on climate. See *RAIN*.

VARICOSE, *var e kose'*, **VEINS**, dilated veins, which are marked by knotty swellings at the valves. The disease commonly affects the lower limbs and sometimes becomes very painful and even dangerous, from the bursting of the veins, though it often is merely an inconvenience. Rest and support in an elevated position and the application of proper bandages are elements in the treatment.

VARIETY, in plant and animal classification, a subdivision of a species, including an individual or group of individuals differing in some nonessential way from the

rest of the species. Varieties are believed to result from differences in climate, nourishment, cultivation and the like, and to be less permanent than species.

In naming plants and animals, the name of the variety is placed third, following the name of the species, as *Ranunculus multifidus*, variety, *terrestris*. Here, *Ranunculus multifidus* is the common, yellow, water crow-foot, and the variety *terrestris* is a form growing on the ground.

VARIOLOID, a mild form of smallpox, induced by inoculation. See *SMALLPOX*.

VARNISH, a transparent liquid made by dissolving gums in alcohol, turpentine or oil. It is used to form a transparent coat over surfaces to protect them from air and moisture or to make them more beautiful. The resinous substances most commonly employed for varnishes are mastic, lac, copal, amber and asphalt, and the solvents are fixed oil, volatile oil and alcohol. Varnishes are colored with arnott, gamboge, saffron, dragon's blood and other substances.

The base of varnish is gum copal, or the fossil gum found in Zanzibar, Sierra Leone, New Zealand and the Philippine Islands. The best gum is found in Zanzibar. When the gum is received in the varnish factory, it is broken up into pieces about the size of small egg coal. As it is being broken up, it is selected, for in one chunk of the amberlike material there may be both transparent and almost opaque streaks; the white transparent gum goes into the making of the best grades of varnish, and the dark-colored gum goes into the poorer grades. After the gum copal is broken, it is run through a series of hand sieves, which divide it into block, nut, chip and dust, for convenience in handling. The gum is then ready for the kettle.

For first-class varnish, Calcutta linseed oil is preferred. This oil is made from the flaxseed of India. The turpentine used for thinning the varnish is of the best and purest grade. The copper kettles in which the melting and mixing are done are on truck wheels, so that they can be rolled over a fire or taken off easily. The melting gum is constantly stirred. When the oil has been mixed with the liquid gum, the kettle is run back over the fire once more, and the gum and oil are boiled again. Then it is set away to cool, after which a quantity of turpentine is mixed with the gum and oil

and the varnish is made. The varnish is strained through cotton before it is pumped into the storage tanks, where it is left to age for at least six months and often for two years.

Shellac varnish is made in churns, or barrels, revolving on journals. The shellac as it comes from India looks like amber-colored mica, for it is in thin sheets and is almost transparent. This shellac is mixed with the proper amount of alcohol, to dissolve it and form the varnish.

VASCO DA GAMA. See **GAMA**, **VASCO DA**.

VASE, a vessel of an ornamental character, generally of pottery but frequently of stone, glass, metal or other materials. Those which have come down to us from ancient times in greatest numbers are the so-called Etruscan vases, made of terra cotta and adorned with painted figures (see **ETRUSKIA**, subhead *Etruscan Vases*). The Greek vases of the oldest style come chiefly from Corinth and the islands of Thera and Melos. Those of the late rich style have been almost exclusively discovered in Lower Italy, Apulia and Lucania. They were probably manufactured there, chiefly in the fourth and third centuries B. C.

Italy, France and Germany in the sixteenth and seventeenth centuries produced many vases which are the perfection of artistic form and execution and since the fifteenth century the Venetian vases have been masterpieces of art. From India, China and Japan also have been obtained vases of various materials, especially of porcelain, vying in elegance of form and beauty of ornamentation with those produced in Europe. Of late, some vases have been produced in the potteries of the United States which compare favorably with those made in other lands.

VASELINE, *vas'elin*, or *vas'leen*, a product composed of a mixture of paraffines, obtained from petroleum after the hydrocarbons are driven off. It is used as a base for ointments, pomades and cold cream, and is employed for coating surgical instruments and steel surfaces, generally to protect them from rust. See **PETROLEUM**.

VASSAR COLLEGE, one of the leading American colleges for women, founded near Poughkeepsie, N. Y., in 1861, and named in honor of Matthew Vassar, whose generosity made its establishment possible.

The college buildings are located on a picturesque elevation. Besides the residence halls, they include Taylor Hall, Rockefeller Hall, Chapel, Thompson Memorial Library, a museum and an observatory. The Students Building is the Social Center. There is also a farm of 675 acres, on which is maintained a model dairy. Conservatories, flower gardens, an open air theater and athletic grounds are other interesting features. Vassar maintains high standards of scholarship and provides courses leading to the degrees of Bachelor of Arts and Master of Arts. There is a faculty of nearly 200, and a student enrollment of about 1,150. The library contains over 150,000 books and pamphlets.

Matthew Vassar (1792-1866), founder of the college, was born at Norfolk, England, but was brought to America when four years old. His boyhood was passed near Poughkeepsie, where his father built up a prosperous brewing business. Besides contributing funds to establish the college which bears his name, he gave generously to other causes.

VATICAN CITY, the smallest independent state in the world, the domain of the Pope. It is also the center of the Roman Catholic religion, therefore the Pope is a temporal ruler as well as the spiritual head of his Church. Before 1870 the Papal States, about 16,000 square miles in Northern Italy, were controlled by the Church, and in them the Pope exercised temporal power. When modern Italy was organized, the Papal States were seized, the Pope was given the Vatican Palace and the Lateran palaces in Rome, in which he secluded himself a voluntary prisoner, and from which his successors never ventured.

Continued protest against loss of temporal power led to an agreement in 1929 by which 108 7 acres within Rome were ceded to the Church, an area once more assigned to the temporal power of the Pope. In addition, 750,000,000 lire in cash and 1,000,000,000 lire in Italian bonds were given to the Pope as added recompense for the loss of the old Papal States. The civil rule of the Pope embraces all legal, executive, and judicial powers, but he entrusts his authority to a governor, who is responsible solely to him. Vatican City possesses its own postal system and coinage. Population, 1932, 1,025.

Vatican Palace, the residence of the Pope, the chief building in Vatican City, no

less famed than St Peter's Church. Its construction was begun about 1150, it has been many times enlarged, and is said to contain 1,100 rooms. On the walls and ceilings are renowned works of art by Michelangelo, Raphael, and others. The library contains priceless collections of manuscripts and rare books, many of them hundreds of years old. The total number of volumes is not less than 250,000.

VATICAN COUNCIL, the Ecumenical Council of the Church of Rome, which met in the Vatican under Pope Pius IX, Dec 8, 1869, and adjourned July 18, 1870. No council had ever been attended by so large a number of ecclesiastics. It declared the personal infallibility of the Pope, when speaking *ex cathedra*, to be a doctrine of the Church, a declaration yet maintained.

VAUDEVILLE, *vodévil*, in the French sense, a kind of farceal comedy in which dialogue is interspersed with dancing, comic acting and songs of the day, a name originally given to a popular humorous drinking song, first composed in the valley of *Fau-de-Tire*. In the United States, vaudeville is merely a series of singing, acting and dancing numbers, pretending to no unity and having no relation to the drama.

VAULT, in architecture, a continued arch, or an arched roof, so constructed that the stones, bricks or other materials of which it is composed, sustain and keep one another in place. Vaults may be cylindrical, elliptical, single, double, cross, diagonal or Gothic.

VEDAS, *va'das*, from a Sanskrit word meaning *know*, the oldest sacred writings of India, written in Sanskrit and supposed to have been produced by a series of authors between 1500 and 1000 B C. The Vedas are four in number, called respectively, the *Rig-Veda*, *Yajur-Veda*, *Sama-Veda* and *Atharva-Veda*. Of these the *Rig-Veda* is the oldest and most important. Its name means *stanzas of praise*, and it consists of more than a thousand hymns, most of them celebrating the deeds and begging the blessing of the greater gods. The other three seem to have been drawn largely from the first one. The latest of the four is sometimes questioned as to authenticity, being concerned rather with superstition than with religion. It reflects the development of the Brahmanical system with its departure from the earlier monotheistic system and its polytheistic rites.

All the Vedas are believed by the Brahmans to be inspired, and are held by them in the highest respect.

VEGA *GABRIO*, *va'ga lah'r'pe o*, **FELIX LOPEZ DE** (1562-1635), a dramatic poet of Spain, best known as Lope de Vega, the most prolific imaginative writer in the annals of literature. Born in Madrid, in 1562, he joined the army, and in 1588 accompanied the Invincible Armada on its ill-fated expedition against England. After being twice married and twice a widower, he became a priest and subsequently entered the order of Saint Francis. He had already published various poems, but his dramatic and poetical productions now multiplied with extraordinary rapidity. For many years there was scarcely a week when he did not produce a play, and he himself declared that he often wrote, rehearsed and produced a play in twenty-four hours. He enjoyed an immense popularity and received marks of distinction from the king of Spain and from Pope Urban VIII. About three hundred of his dramatic works have been printed. They reveal an inexhaustible, though ill-regulated, imagination, a strong mixture of the sublime and the ridiculous and extraordinary facility in versification.

VEGETABLE, *ve'je ta'bil*, **IVORY**. See **IVORY PALM**.

VEGETABLES, in the sense in which the term is generally used, those parts of plants, exclusive of fruits, which are used for food. In some, as the turnip, the roots are the parts used, in others, as the onion, the bulbs. The tubers of the potato and arrachoke, the stems of asparagus, the leaves of the lettuce and cabbage; the flower buds of the cauliflower, the green fruit of the cucumber; the ripe fruit of the tomato; the seeds of corn, peas and beans, are common vegetable foods.

The principal components of vegetables are water, protein, fat, nitrogen, starch and certain indigestible refuse, like fiber and ash. The proportions of these constituents vary among different vegetables, but in all, the principal element is water. The amount of water varies from 58.9 per cent, in green beans, to 95.4 per cent, in the cucumber. The per cent of protein varies from 4 per cent, in the watermelon, to 9.4 per cent, in green beans. The amount of fat varies from 1 per cent, in the pumpkin, the radish, the potato, celery and the beet, to 1.1 per cent in

green corn The amount of nitrogen varies from 22, in lettuce, to 261, in the sweet potato

Of fresh vegetables, green shelled beans have the highest fuel value, and the cucumber has the lowest, the value of the latter being about one-ninth that of the former Others which contain a high fuel value are sweet potatoes, green peas, green corn, sugar peas and parsnips In the cooking of vegetables, besides the loss of water content, there are chemical changes which often detract materially from the food value Vegetables form an important part of the diet, in addition to their nutritive value, they contain many of the vitamins and other elements essential to the health of the body

Related Articles. For descriptions of the vegetables in common use consult the following titles

Artichoke	Corn	Pea
Asparagus	Cress	Potato
Bean	Cucumber	Pumpkin
Beet	Eggplant	Radish
Brussels	Kohi-rabi	Rhubarb
Sprouts	Lentil	Spinach
Cabbage	Lettuce	Squash
Carrot	Onion	Tomato
Cauliflower	Oyster Plant	Turnip
Celery	Parsley	Sweet Potato
Chard	Parsnip	Yam
Chicory		

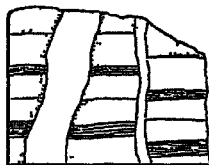
VEGETARIANISM, the belief and practice of subsisting on a vegetable diet to the exclusion of animal food, a doctrine held in ancient times by such men as Pythagoras, Plato and Plutarch and later by Rousseau, Shelley and Swedenborg At present vegetarian societies exist in considerable numbers in the United States, Canada and several European countries A vegetable diet, it is claimed, is more healthful, economical and ethically effective than a diet mixed with animal food Vegetarians differ among themselves, however, as to the degree to which they exclude animal products, some excluding only flesh, others fish and fowl, and others milk, eggs and cheese, as well While scientific investigations on the whole show the superior efficacy of a mixed diet on the human mechanism, the vegetarians have without doubt done society a service in calling attention to the prevailing custom of eating too much meat

VELI, ve'yi, an ancient Etruscan town, in early times the most formidable rival of Rome The Romans and the Veintines were constantly at war, and because the latter were uniformly unsuccessful in pitched battle, they adopted the plan of shutting themselves up in the city when the Romans

approached and of going out to plunder when they were safe from attack The family of Fabius, to whom had been entrusted the defense of Roman territory against the Veintines, were decoyed into ambush and put to death in this manner About 396 B C Camillus took the city, after which it declined to an insignificant village

VEIN, vane, in geology, a formation of igneous rock, occupying a fissure in other rock, as represented by the nearly perpendicular layers

in the figure They often extend into the earth hundreds of feet Veins are usually formed by rock in molten condition, forced into



VEINS

the crevice by pressure, but may also be the result of mineral deposits left by underground waters They often contain ore deposits, as gold, silver and other metals Miners call a metal-bearing vein a *lode* Small veins are often seen in boulders and pebbles, where they can be easily studied See DIKE, GEOLOGY

VEINS, a system of canals, or tubes, distributed throughout the bodies of animals, for the purpose of returning the impure blood to the heart and lungs, after it has been carried to the various parts by the arteries Veins originate in the capillaries as tiny tubes, and as they unite they decrease in number and increase in size, till all those from the head, neck and upper extremities form the *superior vena cava* and those from the other parts of the body form the *inferior vena cava* Both these large veins empty into the right auricle of the heart The position of the veins in the circulatory system is shown in the color plate accompanying the article CIRCULATION

The walls of the veins, like those of the arteries, are composed of three coats, but they are less elastic and have no pulsation They collapse readily when empty. The distinguishing parts of a vein are the valves, which are made of folds in the internal coat and are arranged in pairs They lie against the walls when the blood is flowing onward, but if from any cause the flow is obstructed the valves are forced upward till they meet in the middle of the vein, and so prevent the

blood from flowing backward The action of the valves may be shown by pressing on some vein near the surface, thus preventing the flow of the blood toward the heart, when the valves will make little elevations in the vein Valves are not found in the very smallest veins, nor in those of the abdomen, lungs and brain

The blood flowing from a wounded vein is dark in color and comes out in an even stream To check the flow, press on the vein below the wound or between it and the extremity

Related Articles Consult the following titles for additional information
Arteries Circulation
Capillaries Wound

VELAZQUEZ, or **VELASQUEZ**, *ve lahs' laith*, DON DIEGO RODRIGUEZ DE SILVA (1599-1660), the greatest master of Spanish painting He was born at Seville, of Portuguese parents, and studied first under Francisco Herrera the elder, and afterward under Francisco Pacheco In 1622 he went to Madrid, and as the result of this visit received an appointment as principal painter to Philip IV Through the advice and intercession of Rubens, Velazquez went later to Italy, where he closely studied the works of Michelangelo, Raphael and Titian and the contemporary painters, especially Guido Reni, whose influence is evident to a marked degree in his works On his return to Spain, in 1631, Velazquez was received with great distinction, and in 1658 the king raised him to the dignity of a noble

Velazquez' chief characteristic in painting is naturalism He was never imaginative, but painted exactly what he saw, combining this power of realism with a mastery of light, shade, coloring and composition Among his finest works are the *Aguador*, or *Water Carrier*, a *Nativity*, or *Adoration of the Shepherds*, the *Brothers of Joseph*, *Moses Taken from the Nile*, portraits of Philip IV and of Elizabeth, his queen, Pope Innocent X and other dignitaries, and many pictures both from history and from common life

VELOCIPEDE, *ve los'e peed*, a light vehicle or carriage propelled by the feet of its

rider One of the older forms of this carriage was constructed of two wheels of nearly equal size, placed one before the other and connected by a beam, on which the driver's seat was fixed The rider, sitting astride the machine, propelled it by the thrust of each foot on the ground This form dates from the early part of the nineteenth century It was about half a century later that treadles, operating cranks on the axle of the front wheel, came into use See **BICYCLE**

VELOCITY, *ve los'e ty*, the rate at which a body changes its position in space Velocity is popularly expressed as so many miles per hour or as so many feet per second The velocity of a body is *uniform*, when it passes through equal spaces in equal times, it is *variable*, when the spaces passed through in equal times are unequal, it is *accelerated*, when during each portion of time it passes through a greater space than during the preceding equal portion, it is *retarded*, when a less space is passed through in each successive portion of time Linear velocity is speed forward in a straight line, angular velocity is speed about an axis

VEL'VET, the most familiar of the fabrics woven with a pile, produced by adding to the usual threads of the warp and weft an additional row of warp yarns, woven into the ground of the cloth and passed over wires on the surface In the case of a loop pile, the wires are drawn out, without cutting, but for velvet or other cut pile, a knife is passed along a groove on the top of each wire before the wire is withdrawn Real velvet is made entirely of silk Cotton and woolen goods, woven in this manner, are called *velveteen* and *plush*, respectively

Some of the richest and most artistic of the textiles woven on Italian looms in the fifteenth and sixteenth centuries were made, in part at least, of velvet. Similar stuffs were also made in Spain and Flanders Many of these were for ecclesiastical vestments and altar cloths, and for hangings The effect of a raised pattern in velvet, on a plain or figured silk ground, is very beautiful Sometimes a design is formed of a long, upon a short, pile, called *velvet upon velvet*, and this, too, has a fine effect Velvet is believed to have been made first in China.

VELVET LEAF. See **INDIAN MALLOW**
VENATION, *ve na'shun*, the arrangement of veins in leaves, related to the shape of the leaf and its mode of germination, an im-



VELAZQUEZ

portant characteristic in the classification of plants. Most leaves are netted-veined, parallel-veined or fork-veined. The netted-veined are the most numerous, and are divided into several groups. True netted leaves have a single midrib from which branch primary veins terminating in delicate veinlets that curve upward just within the margin of the leaf. If the primary veins extend directly to the edge of the leaf they are said to be feather-veined. For illustrations of venation, see the article LEAVES.

VENDETTA, an Italian word, taken from the Latin *vindicta*, meaning *revenge*, is a blood feud in which the next of kin assumes responsibility for avenging a murdered person, probably a survival of methods of enforcing justice practiced before the organization of the state and of public courts. In Corsica the vendetta is held to be one of the most binding of family obligations, and the custom is held to be a greater or less degree among the Albanians, Druses, Bedouins and other isolated and primitive peoples. The feuds among the mountaineers of Eastern Kentucky and Tennessee and Western Virginia in America are analogous to the vendetta.

VENDOME, *vahn'dohm'*, **COLUMN**, 142 feet high, stands in Paris, in the Place de la Vendome. It was built in 1811 by Napoleon's order, was later thrown down by the communists, but the preserved pieces were re-erected on the same spot in 1875. The masonry column is set with 900 feet of bronze, made from 1,200 melted captured cannon, depicting memorable scenes in the Napoleonic campaigns from 1806 to 1810. The Place Vendome was named for the Duke of Vendome, who as a member of a noble house of the old French kingdom served his country in many wars.

VENEER, a thin layer of hard wood, as mahogany, rosewood or maple, glued to the surface of wood of a commoner sort, to give the whole the appearance of being of the more valuable material. It is used for furniture and some interior finishings. Owing to recent improvements in sawing machinery, layers can be obtained that are almost as thin as paper. A good piece of veneer, contrary to popular belief, may be more serviceable than solid wood, for the reason that it is less likely to warp and crack.

VENETIAN, *ve ne'shan*, **SCHOOL OF PAINTING**. See PAINTING.



Statue of
Simon Bolívar

VENEZUELA, *ven e swé'la*, a republic of South America, officially known as the UNITED STATES OF VENEZUELA, lying north of Brazil and north and east of Colombia. The coast line, which borders on the Caribbean Sea, has a number of important indentations, the largest being the Gulf of Venezuela and the Gulf of Paria. The country contains twenty-two states, two territories and a Federal district in which the capital is located. Its greatest extent from northeast to southwest is about 925 miles, and from north to south, 725 miles. Having an area of 393,976 square miles, it is the seventh country of South America in area, and is but little smaller than California, Montana and Oregon combined.

The People. By far the largest proportion of the inhabitants are Indians. Among the *meztizos*, or natives, there are many of negro blood. The whites are of Spanish descent, they represent the culture and customs of Spain, and constitute the ruling class. The country is unevenly populated, most of the people living in the agricultural and mountainous regions of the northwest. The interior is largely unexplored and uninhabited. Spanish is the prevailing language. A 1932 estimate showed a population of 3,261,734. The Roman Catholic is the leading Church, but all faiths are tolerated.

Education is free and compulsory, but the elementary schools are poor, and the attendance laws are not enforced. In 1933 there were only 121,000 pupils in the elementary schools. There were fifty-eight secondary schools for boys, thirty-eight for girls and six for both sexes. At Caracas, the capital, there is a normal school for men and one for women. There were also thirty-four schools for higher instruction and twenty-one academies. There are universities at Caracas and Merida. There are also military, commercial and other schools in the various cities. But notwithstanding all these institutions and efforts to educate the youth, it is estimated that at least three-fourths of the inhabitants are unable to read and write.

Surface and Drainage. Venezuela is naturally divided into three surface regions. These are the highland region in the northwest, the Guiana highlands in the southeast and the Orinoco valley between. The highland region, in the northwest, is formed by two ranges of the Andes Mountains, one of which extends directly north and south and forms the boundary between Venezuela and Colombia. This range contains some summits with an altitude of 10,000 feet. The other range enters the country near the headwaters of the Orinoco and extends northeasterly to the Gulf of Triest. This range contains the highest land in the country; some of the peaks have an altitude of over 15,000 feet and are capped with perpetual snow. Between these ranges of the Andes is the low depression occupied by Lake Maracaibo, which is directly connected with the sea. The boundary between Venezuela and Brazil is formed by the Parima and Pacarima mountains, which rise to altitudes varying from 6,000 to 11,000 feet. From these ranges the land gradually descends to the basin of the Orinoco. This great interior is divided into the lowlands, along the lower part of the river's course, and the llanos, which lie chiefly north of the river and between it and the Andes. A portion of this region is yet unexplored, but it is supposed to consist of rolling plains and hills, heavily covered with forests.

Venezuela is supposed to have over 1,000 rivers and is perhaps more completely watered than any other country of South America. Chief among these rivers is the Orinoco, flowing through the middle of the country, and its chief tributaries, the Apure, the Meta and the Rio Negro, the last of which is connected with the Amazon by the Cassiquiare. The Orinoco and its chief tributaries, all of which are navigable, furnish an outlet not only for the interior of Venezuela, but for a portion of Colombia as well. There are a number of less important streams flowing into the Caribbean Sea. Of the lakes, Maracaibo, in the northwestern part, is the largest and most important.

Climate. The climate of Venezuela depends upon altitude more than upon latitude. The varying elevations of the country divide it into three climatic regions. The first is the lowland region, which extends from sea level to an altitude of 2,300 feet. This has a hot, tropical climate, with a mean annual

temperature of about 77°. The second is the region of the interior, ranging in altitude from 2,300 to 6,500 feet. This region has a salubrious, temperate climate, with a mean temperature of about 65° and with a comparatively narrow range of temperature, the thermometer seldom rising above 80° or falling below 60°. In the highlands of the mountains is a cold region, which ranges in mean temperature from near freezing point to that of perpetual snow. There are two seasons, the rainy and the dry. During the rainy season the lowlands and most of the interior receive copious rain, in some sections sufficient to flood the country. Along the coast and the lower courses of the rivers the climate is somewhat unhealthy, but the temperate regions of the interior are pleasant and healthful, even to those who are accustomed to temperate latitudes.

Mineral Resources. The country contains large deposits of minerals. Gold is found in the Yurua territory and is mined to a considerable extent, the annual output is now not far from 92,000 ounces. Silver mines occur in the central, southern and southwestern parts of the country, while copper and iron are widely distributed. Some tin is also found. Other minerals of importance are sulphur, coal and kaolin. There are a number of salt mines in the country, and they are worked by the government. In petroleum production Venezuela is now the second country in the world—about 120,000,000 barrels a year. There are valuable deposits of asphalt on the island of Trinidad, in the vicinity of Maracaibo and in the State of Bermudez. This is the richest asphalt region in the world. Granite, marble and other building stones are widely distributed over the country. Lack of capital and transportation facilities has thus far prevented the exploitation of the mineral industries.

Agriculture. Agriculture is the chief occupation of the inhabitants. However, only about one-ninth of the surface is under cultivation. The chief crops are coffee, cacao, sugar cane, cereals, fruits, beans, potatoes and other vegetables. Tobacco is successfully cultivated in the lowlands, and the forests furnish valuable products for export, chief among which are copals, vanilla and rubber. In general, agriculture is in a backward state. Primitive implements and methods are used, and but poor returns are received for the capital and labor invested. The large areas

of pasture land particularly adapt the country to cattle raising, and thus is one of the most important branches of agricultural industry. The country also has large numbers of horses, goats and sheep.

Manufactures. The manufactures are comparatively unimportant and are confined to the larger cities. The chief industries are the manufacture of cotton goods, shoes, hats, carriages, furniture and agricultural implements. The country also has a number of breweries and distilleries. Refrigerating plants for supplying meat for shipment have been established at Puerto Cabello and Baranco, and a coconut butter and oil factory has been opened at Cumana. The most important manufacturing industries are exploited by foreign capital and are under foreign management.

Transportation. The interior is reached by the Orinoco and its navigable tributaries. Much advancement within recent years has been made in road-building. Motoring is possible now on 5,000 miles of highway. Caracas is joined with its seaport, La Guaira, by railway. A few other interior towns are also connected with seaports in this way. In all, the country has over 600 miles of railway in operation. Through a French cable it has communication with the rest of the world, and the cities and towns have telegraph, telephone, and radio service.

The leading seaports are connected by steamer with the ports of Europe and the United States. The commerce of the country is not as great as its resources and population would warrant. The chief article of export is coffee. Other important exports include cacao, hides, deer and goat skins, rubber, balata, tobacco, fustic and other forest products. Some cattle are shipped to Cuba. Most of the coffee and hides go to the United States. The imports consist of foodstuffs, manufactured goods and machinery.

Government. The government is republican in form. The present constitution was adopted in 1914. The head of the executive department is the President, who is elected for seven years and is assisted by a Cabinet of Ministers, through whom he acts. The members of the council are appointed by Congress every two years, and the President is chosen by the Congress. The legislative power is vested in a Congress of two houses, a Senate and a Chamber of Deputies. The

members of the Senate are apportioned two to each state and district, and are elected for three years. The Deputies are apportioned according to population, one to every 35,000 and one every 15,000 additional inhabitants, and are elected by universal suffrage. No state is deprived of a Deputy if its population is less than 35,000. Each province or state has its own legislature and executive, while the unorganized territories and colonies are governed by an executive appointed by the national government.

History. The coast of Venezuela was first seen by Columbus in 1498. The following year it was more carefully examined by Vesputius, who gave the region the name it now bears, which means *Little Venice*; it was applied because of the discovery of an Indian village built on palisades over the waters of Lake Maracubo. The first Spanish settlement was made in 1527, and for more than two centuries the country was a Spanish colony, during which time it suffered from change of rulers and internal dissensions. The early Spaniards treated the natives in a most cruel manner and enslaved many of them. The struggle for independence began early in the nineteenth century and was completed by the efforts of the patriots under Bolivar in 1821, when Venezuela and New Granada united under one government and formed the country of Colombia. In 1829 Venezuela seceded and became an independent republic. The country has always suffered from frequent revolutions and rebellions. It has also had several disputes with European powers concerning boundary lines. The last of these assumed such importance that in 1894 the United States recognized the seriousness of the contention between Venezuela and Great Britain and suggested to the latter country that the dispute be settled by arbitration. This was finally agreed to, and the question was submitted to a special tribunal, which in 1899 made final settlement of the boundary line between Venezuela and British Guiana.

In 1897 a serious political disturbance began, which led, two years later, to a rebellion. This became so widespread that it threatened the existence of the established government, but in October, 1902, the revolutionists suffered a serious defeat, and their army was dispersed. In 1902 the country had a serious dispute with France, Germany and Great Britain over the payment of claims

due subjects of these several nations, and in December Great Britain and Germany combined in a naval demonstration and blockaded some of the Venezuelan ports. Through the intercession of the United States, however, all parties agreed to submit the dispute to the court of arbitration at The Hague, and the points in dispute were satisfactorily adjusted.

Related Articles Consult the following titles for additional information
 Bolivia, Simon Maracalibo
 Caracas Trinidad

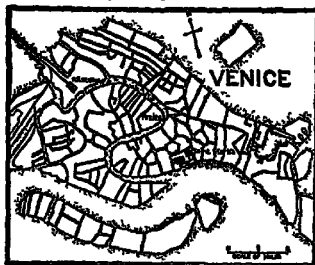
VENICE, ven'is, ITALY, now called Venezia, a city famed for its unique character and splendid art treasures. Venice, built on a cluster of islands, has canals for its principal streets, and more bridges than any other city in the world. Gondolas and other boats take the place of cabs, street cars and automobiles. The city lies in a sheltered lagoon on the northwestern shore of the Adriatic Sea, 164 miles by rail east of Milan. The islands on which it is built number 120, and are divided into two main groups, between which flows the celebrated Grand Canal. This canal, which is the principal thoroughfare, passes through the city in the form of a letter S and divides it into two nearly equal parts. The canal is crossed by four bridges, the chief of which is the Rialto. There are 146 smaller canals, by means of which all parts of the city can be reached by boat.

The description which follows applies to Venice as it exists in normal years. During the World War it was repeatedly attacked by airplanes, and was on one occasion threatened with capture. Its most valuable art treasures were removed to Rome and other interior centers, but these were returned at the close of the war.

The Piazza, or Square of Saint Mark's, is the center of interest. This is the great center of business and amusement. It is 576 feet long, 269 feet wide on one side and 185 feet wide on the other. The east side is faced by the Cathedral of Saint Mark's, one of the most renowned structures of its kind in the world. On the north and south sides of the square are the palaces formerly occupied by the procurators of the cathedral, and they now form a part of the royal palace. These buildings contain many rare paintings by some of the most celebrated artists of Venice, including Tintoretto and Paul Veronese. The famous Campanile, which fell in 1902, and was rebuilt, also faces the square. Another object of interest facing

the square is the clock tower, built in 1496 and surmounted by two bronze figures, which strike the hours on a large bell.

Among the churches of special interest is that of Santa Maria della Salute, which contains excellent paintings of Titian, including



his masterpiece, *The Assumption of the Virgin*, and *The Presentation in the Temple*. The Church of San Sebastiano is celebrated for its altarpieces by Paul Veronese, and the Friari, a church built for the friars, is interesting for its size and because it is a good representation of the Italian Gothic style of architecture. It contains many monuments and pictures. The palaces are of no less interest than the churches. Of these the palace of the Doges, originally built in 800, but several times destroyed and rebuilt, is the most important. During the time of Venice's greatest prosperity, this was the residence of its rulers. It now contains many treasures of art. From the rear of this palace the celebrated "Bridge of Sighs" leads to the prison, which is still in use. Many of the palaces are now used for other purposes, serving as hotels, museums and office buildings. The Academy of Fine Arts is also of great interest, because it contains one of the most valuable collections of paintings found in Europe. The Rialto is the principal commercial street and typically represents the life of the city. The bridge of this name crosses the Grand Canal at the point where the first settlement was made.

Modern Venice is of considerable commercial importance. The manufactures include lace, tapestries, mosaics, bronzes, jewelry and wood-carvings among its finer wares, and cotton and woolen goods, chemicals, heavy machinery and clocks among its larger industries. There is also some shipbuilding, and glassware is manufactured.

The islands occupied by the city were formerly a refuge from the hordes of barbarians which invaded Italy from the north. It is supposed that the first settlement was made about the middle of the fifth century, but there is no authentic record of the fact. In the sixth century Venice was independent, though it was tributary to the Eastern Empire. It was obliged to defend itself from pirates and from the Lombards of Italy, and because of this an organized government was formed and the leader or ruler, entitled *doge*, was selected. The Crusades gave the city a great impetus, because it became a commercial center for these military movements.

During the Middle Ages Venice had increased in commercial importance and power until considerable surrounding territory of the mainland was under its control, and just previous to the discovery of America it was the leading commercial city of Europe. From that time its influence began to wane. The Turks captured Constantinople and cut off much of the trade from the East. A route to India around the Cape of Good Hope also brought much of that trade to Portugal, and the commerce which had entered Europe through Venetian harbors now came through Genoa and other cities to the west. In 1797 the Venetian Republic was deprived of its independence by Napoleon, and most of the possessions were given to Austria. Within a few years the Austrians ceded Venice to Italy. Between this time and 1866, the city was alternately under the rule of Austria and Italy, until finally by vote of the inhabitants it was joined to Italy.

The proximity of Venice to the war zone during the World War, especially after the Austro-German drive of 1917, caused great anxiety as to its fate, but it was never captured. However, the uncertain conditions caused thousands of its inhabitants to flee, and until the close of the war it retained only the memories of its former glory and activity. Time and peace have restored its prosperity and made it again the mecca of art lovers and tourists. In 1921 the population was 171,665, ten years later it had increased to 260,250.

Related Articles. Consult the following titles for additional information
 Adriatic Sea Doge
 Bridge of Sighs Saint Mark's
 Campanile Cathedral of

VENIZELLOS, *ven e sa' lohs*, ELEUTHERIOS (1864-1936), an eminent Greek lawyer and

statesman, through whose influence Greece was brought into the World War on the side of the entente allies, was born of humble parentage on the island of Crete. He was educated in Canes, Crete and the University of Athens. After completing his education Venizelos returned to Crete, and at the age of twenty-three was elected to the assembly, where he soon became the leader of the liberal party. In 1910 he removed to Athens to become the leader of a party founded by the Military League, which was working for constitutional reform. Within a year he was chosen Prime Minister.

In 1913 King Constantine, whose wife was a sister of Emperor William II, ascended the throne of Greece. At the outbreak of the World War, Venizelos led the movement to unite Greece with the entente allies, but Constantine advocated strict neutrality. Venizelos resigned in March, 1915, since he and the king could not work together. He was, however, persuaded to form a new Ministry, when Bulgaria entered the war against Serbia, he insisted that the Greek forces be mobilized, and accomplished his purpose in spite of the king's opposition. Since Greece was bound by treaty to go to the aid of Serbia if it were attacked by Bulgaria, Venizelos insisted that this agreement be fulfilled. Constantine refused his consent, and the Prime Minister again resigned.

In September, 1916, Venizelos and his followers set up a provisional government at Canes, but later transferred it to Saloniki. When Constantine was forced to abdicate in 1917, Venizelos was returned to power and Greece joined the forces against the Central Powers. He represented his country at the peace conference at Versailles in 1919. In 1935 Venizelos inspired a revolution against the government, which failed, and he sought refuge in Paris.

VENTILATION, *ven ti la'shun*. See HEATING AND VENTILATION.

VENTRILOQUISM, *ven tri' o kwiz'm*, the art of speaking in such a way that the voice seems to come not from the speaker but from another source. Long practice is necessary to develop the art to perfection. The ventriloquist is able to "throw his voice," or produce the illusion of distance chiefly by proper control of his larynx. He draws a full breath, speaks without moving the muscles of his face, neck or chest, expelling the air through a narrow glottis. The ven-

triloquist's success depends largely on his skill in directing the imagination of his audience. The human ear is not quick to detect the direction from which a sound comes, and if a listener's attention is directed to a particular location his imagination is apt to associate it with the sound he hears.

VENUE, CHANGE OF, a change in the county or judicial district in which a case in law is brought to trial. It is made for the convenience of witnesses or on motion of the defense because prejudice on the part of the court or community precludes a fair trial in the jurisdiction where the action is brought. Change of venue is regulated by statute.

VENUS, the Roman name for the goddess of love. The Greeks called her **APHRODITE**. By some accounts she was the daughter of Jupiter, but according to the most popular legend she was born from the sea foam, near the island of Cythera. She was brought up by the nymphs in their ocean caves, and when she had attained the fulness of her size and beauty, she was conducted to Olympus, where she excited the greatest admiration. All of the gods wished to marry her, but she scorned them all, and as a punishment she was compelled by Jupiter to marry Vulcan, the ugliest of the gods. He gained no great happiness from the union, for Venus always despised him and bestowed her love on Mars and on the mortals Adonis and Anchises. Cupid was her son by Mars, and Aeneas was her son by Anchises. Venus was the special protectress of all young people who were in love, but she does not seem to have continued her interest in their affairs after they were once married. She was consequently chiefly worshiped by young people.

VENUS, one of the smallest but the most brilliant and conspicuous of the planets, second from the sun, its orbit lying between Mercury and the Earth. To the ancients Venus was known as *Lucifer*, morning star, and *Hesperus*, evening star, according as it was seen after sunset or before sunrise. As evening star on clear moonless nights it may be observed to cast a shadow, its reflecting power being three times as great as that of the moon, due probably to a dense atmosphere and the presence of many clouds. The diameter of Venus is 7,700 miles, and it is 67,200,000 miles distant from the sun. Its sidereal revolution is performed in 225

days, its rotation period remains in doubt, because of difficulty of observation. It has various phases, according to the position it occupies, appearing as a thin crescent, gradually increasing to a full circle and then decreasing until it disappears.

Transit of Venus, the passage of the planet Venus across the disk of the sun, an occurrence of unsurpassed interest to astronomers and the entire scientific world. A full transit of Venus across the center of the sun's disk occupies about eight hours, the time being shortened when it occurs nearer the edge of the disk. Transits of Venus were observed in 1874 and 1882, and will occur again in 2004 and 2012.

VENUS DE MILO. See **SCULPTURE**.

VENUS'S FLOWER BASKET, a beautiful sponge, whose skeleton looks like spun glass, woven into an exquisite pattern, so delicate and white that one can scarcely believe it to be a natural skeleton. It is found in the deep sea near the Philippine Islands.

VENUS'S FLYTRAP, or **DIONAEA**, *dionea*, a plant of the sundew family, the leaves of which serve as traps for insects, upon which the plant feeds. It grows in the sandy soil of the North Carolina coast, and the insects it entraps are necessary to supply it with the nitrogen lacking in the earth. A flower stalk bearing a cluster of small white flowers rises from a rosette of leaves which spring directly from the ground. Each leaf is divided into two parts, the lower, flat and blade-like in appearance, and the upper, a roundish portion, consisting of two lobes, divided by a midrib. On the surfaces of the lobes are sensitive, hair-like processes, and along the edges are sharp bristles. When an insect alights on one of these sensitive hairs, the two lobes come together like a trap. A fluid is secreted by means of which the plant assimilates the juices of the animal. When the food is exhausted the leaf opens. After a leaf has captured several insects it loses its vitality and dies. See **SUNDEW**.



VENUS'S FLYTRAP

VERA CRUZ, *va'rah krooz*, MEXICO, the chief seaport of the republic, situated on an arm of the Gulf of Mexico, about 190 miles east of Mexico City. Though the site is low and sandy and the climate somewhat unhealthy, the construction of sanitation and port works has greatly improved conditions and has prevented the recurrence of periodic outbreaks of yellow fever. At the entrance of the fine harbor is the picturesque old fortress of San Juan de Ulloa, formerly used as a prison, but now only an interesting relic of colonial days. The city itself, with its encircling wall built of coral, is very attractive. Buildings of recent construction include a customhouse and a post and telegraph office, both constructed of cement, and the handsome building of the general lighthouse board, erected on land reclaimed from the sea. The dwelling houses of Vera Cruz are built of coral limestone in Spanish style.

The streets of the city are narrow, but are straight and well-kept, and are paved with asphalt over a wide area. Liberty Boulevard is the handsomest thoroughfare, and there are two public gardens. Prominent institutions include Vera Cruz Institute (a high school), the naval school, the only one of the kind in Mexico, the public library and a hospital. There are several factories, and fishing is an important occupation. Vera Cruz has a large, commodious harbor, with modern docks and other improvements, and enjoys a large general trade. Regular lines of steamers from the United States, the West Indies and Europe visit the port, and four railway lines meet here.

The city was founded by Cortez in 1520. During the Mexican War it was captured by Americans, and in 1914 it was temporarily occupied by United States marines as a result of Huerta's insult to the flag (see MEXICO, subhead *History*). To the Americans chief credit is due for making the city sanitary, for during their occupation they cleaned it thoroughly. Population, 1930, 71,883.

VERB. The verb is that part of speech which expresses action or that tells what some object is or does, as, "The boy runs," "The man lifts the stone," "Fishes swim," "He suffers much," "The leaves are green." Verbs usually have the power of indicating time and mode, by means of tenses and moods,

these varying in the different languages, as does also the conjugation, or system of verbal inflections and forms as a whole.

According to their relation to objects, verbs are classed as *transitive* and *intransitive*. A transitive does or may take an object, as "John struck Harry." An intransitive verb may not or cannot take an object, as "The tree falls." Some verbs are used both transitively and intransitively, as "The boy studies" and "The boy studies his lesson." According to their form in different tenses, verbs are *regular* or *irregular*. A regular verb forms its past tense and past participle by adding *d* or *ed* to the present tense form, as *live*, *lived*. Irregular verbs form their past tense and past participle otherwise, as *give*, *gave*.

Transitive verbs are in the *active* or *passive voice*, according to their representation of the subject as *acting* or as *being acted upon*, as "The sun attracts the earth," "The earth is attracted by the sun." *Auxiliary* verbs are those used with principal verbs to indicate mood and tense, as "The man is here," "The man was here yesterday," "I will go tomorrow." *Inflection* of a verb is giving the changes in form to denote person, number and tense. *Conjugation* is the process of systematically carrying a verb through all its different moods, tenses, persons and numbers, in both active and passive voices, if it is a transitive verb.

VERBENA, *ver de' nah*, a genus of tropical and subtropical American plants of the vervain family, several species of which are cultivated for the beauty of their flowers. The cultivated varieties have creeping or spreading stems and bear their blossoms in dense, showy spikes, of almost every color except yellow. The wild varieties are often troublesome as weeds. The verbenas of the perfumers is the lemon grass, from which the oil of verbenas is extracted.

VERDI, *ver'de*, GIUSEPPE (1813-1901), the greatest composer of opera Italy has produced. He was born at Roncole, near Parma, the son of a poor storekeeper. He early showed a fondness for music, and at the age of eight began his studies with the village organist. Later he was taught for three years by the organist of a neighboring village. Verdi then went to Milan and placed himself under the conductor of the famous Scala Theater. In 1839 an opera of his was accepted by the Scala management, and the price paid for it—about four

hundred dollars—was more money than the composer had ever before possessed in all the combined years of his life. Verdi had married some years previously, and the struggle with poverty had been a hard one.

With the acceptance of his first opera and commissions for new ones, the eve of a better day seemed at hand. Then suddenly his wife and both of his children died. After a long period of inactivity which followed this crushing loss, the composer returned to his labors with redoubled energy and produced in succession *The Corsair*, *Rigoletto*, *Il Trovatore* and *La Traviata*, and in a few years Verdi found himself a rich man. In 1870 the khedive of Egypt commissioned from him an opera for the opening of a Cairo Theater, and *Aida* was written. This is considered his best work. Later operas were *Othello* and *Falstaff*, both founded on the Shakespearean dramas of the same names. No other composer of opera has so endeared himself to the masses as has Verdi. The haunting melodies of *Il Trovatore* and of others scarcely less famous are known throughout the world.

VERDIGRIS, *ver' de gress*, a greenish substance that forms on copper when exposed to acetic acid. It is used principally in the composition of paints and Paris Green, in the manufacture of dyes and as an ointment, or liniment. Taken internally, it is poisonous. White of egg and milk are antidotes.

VERDUN, *ver' duN'*, FRANCE, a fortified city, on an almost direct line between Paris and Metz, 175 miles from the former, and on the Meuse River. Its fame is not derived from its size or from its industrial importance, but because it has been "a rock of history, around which the storms of battle have raged repeatedly." It had a population of about 21,000 in 1914, its industrial activity included a few factories which produced hardware, leather goods, and confections, and liquor was distilled. In 1933, fifteen years after the devastation wrought by the World War, its people had not recovered from the disaster, for the population



GIUSEPPE VERDI

was then only 13,000. Other sieges had the city withstood, but between 1914 and 1918, Verdun was the center of the German offensive in its attempts to reach Paris, and its destruction was almost complete. But the long siege failed. (See below.)

Battle of Verdun. After the war of 1870-1871 Verdun was made a first-class fortress, having about it a thirty-mile ring of sixteen large forts and twenty smaller works. The great attack on the outer defenses was begun in February, 1916. General Pétain commanded the French forces. During seven months of the most sanguinary fighting, from February to September, the Germans gained 130 square miles of territory, but failed to capture the heart of the fortress, had they succeeded they would have made a breach in the allied defense of Paris. In October a counter-attack under General Nivelle was begun, which was followed by a second offensive in December. The French succeeded in reaching the second line of defenses by February, 1917, and, after a period of inactivity, began a third offensive in August. A succession of smashing blows drove the Germans back until all the dominating positions were in French hands. The Battle of Verdun is counted a great allied victory. The losses were exceedingly heavy on both sides; it is believed the Germans lost over half a million men.

VERESTCHAGIN, *ver' est shchah'gin* VASIA (1842-1904), a Russian painter, noted especially for his pictures of war scenes. He was born at Novgorod, and was educated in Saint Petersburg (Petrograd) and in France and Germany. Among his productions are a series of paintings based on the expedition of 1867 against the Central Asian provinces, *The Departure of Napoleon from Moscow* and *Roosevelt at the Head of the Rough Riders*. Verestchagin depicted the cruel side of war with remarkable realism. He was killed in the Russo-Japanese War, while on a battleship which was sunk by the Japanese.

VERGIL, *ver' jil* (70-19 B.C.), the common designation of Publius Vergilius Maro, a great Roman poet, author of the *Aeneid*. He was born near Mantua, in northern Italy, and was the son of a small land-owner. His education, which was careful and thorough, was received at Cremona, Milan, Naples and Rome, where he became thoroughly acquainted with the Epicurean philosophy. A

naturally retiring disposition and a delicate constitution, together with the fact of his not being by birth a Roman citizen, would have checked any aspirations he might have had to the calling of the soldier, the orator or the statesman. He retired to his father's estate, with the intention of passing his life in the pursuit of poetry and agriculture, but was rudely disturbed by the allotment of his farm to the soldiers of Octavius, after the Battle of Philippi (42 B.C.). He recovered it through the aid of Asinius Pollio, the Roman governor, but further troubles arose, and he abandoned it, going at the instance of friends to Rome, where soon afterward he became acquainted with Maecenas and Octavius, to whom Pollio had recommended him. Through these powerful friends he received an estate in Campania and was enabled to devote his life to his favorite pursuits.

Vergil had become a great favorite of Octavius, and when, after the Battle of Actium (31 B.C.), the latter became Augustus, the poet was not forgotten. It was under the encouragement and patronage of the emperor that Vergil's greatest work, the *Aeneid*, was written; and indeed only the firm establishment of the Empire and the glorious achievements of Augustus in war and peace could have produced such an epic. During the years of its composition the poet recited selections before the imperial household. When the *Aeneid* was brought to a close, Vergil went to Athens, intending to spend a few years in revising the poem and completing certain unfinished parts. Soon afterward Augustus arrived in Athens from the East, and he induced Vergil to accompany him to Italy. Under the strain of seasickness and exposure to the strong sea air, his delicate constitution broke down, and he barely lived to reach Italy, dying at Brundisium, Sept. 21, 19 B.C. Rather than leave his life-work, the *Aeneid*, imperfect and incomplete, he ordered it burned, but finally yielded to the request of Augustus, that its revision might be entrusted to his friends Tucca and Varius, who edited it with the utmost care. The first of Vergil's poems of which the authorship is certain are the *Bucolics*, or *Eclologues*. While based on the model of the *Idylls* of Theocritus, these ten poems are by no means solely pastoral in character. Many contain allusions or are entirely devoted to current political events or to matters concerning the poet, the background and language alone

being pastoral. The *Georgics* comprise four books of didactic poems on agricultural subjects. Book I deals with the tilling of the soil; Book II, with the cultivation of fruit trees; Book III tells of horses and cattle, and Book IV treats of bees. The *Georgics* are addressed to Maecenas and were said by some to have been written at his patron's request, the work is the most finished of all Vergil's poetry.

The *Aeneid*, the composition of which probably occupied most of the twelve years between the beginning of Augustus's reign and the poet's death, is Vergil's greatest work, although it is not as highly polished as some of his other poems. In general treatment of character and incident, it is inferior to its Greek models, the *Iliad* and the *Odyssey*, but certain parts are very successfully handled; and the whole poem is conceived in a spirit of delicacy, true culture and noble patriotism. In refinement of expression and elegant metrical construction, Vergil has not been surpassed. For an outline of the poem, see *AENEID*.

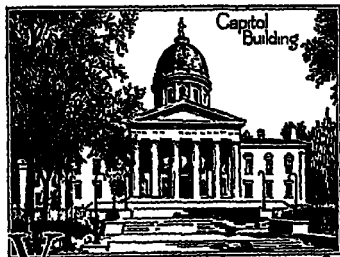
VERMES, *var'mees*, or **WORMS**, that branch of the animal kingdom formerly including all invertebrate creatures (those without backbones) except the insects, but now restricted to such forms as earthworms, sea-worms and leeches. Most of the animals of this division have long, flat or cylindrical bodies, which are divided more or less distinctly into segments which have no limbs. Many of the Vermes are parasites, and some live in the intestines of human beings, where they cause great discomfort. See **ZOOLOGY**.

VERMICELLI, *var me che'lle* or *var me se'lle*. See **MACARONI**.

VERMIFORM, *var'me form*, **APPENDIX**, a long, slender, wormlike organ, which opens from the colon near its lower end. It is normally from three to four inches in length and is hollow to its tip. It is in the right side of the lower abdomen and projects upward in most cases. It performs no bodily function, but is the source of appendicitis (which see).

VERMILION, a bright red pigment, named from a French word meaning *little worm*, because formerly crimson, or carmine, was obtained from a small red worm. The vermilion of commerce is obtained by mixing together in a revolving drum, mercury, sulphur and a solution of potash in

water, and heating the mixture to about 115°, when it gradually assumes a red color. Vermilion is a permanent color and can be used with water or oil, but volatilizes at red heat and cannot be used for enamels. Cinnabar, a sulphide of mercury which occurs in large quantities in California, Brazil, Spain, China and other countries, is also a valuable source of vermilion.



VERMONT, the second largest of the New England states, popularly called the **GREEN MOUNTAIN STATE**, *green mountains* being an English translation of the French words *verts* and *monts*, from which *Vermont* is derived. The state is appropriately named, for its picturesque mountains with their wooded slopes are among the most charming phases of New England scenery. The flower emblem of the state is the red clover.

Location and Area. Vermont lies directly south of the Canadian province of Quebec, and its southern boundary follows the northern Massachusetts line. It is bounded on the east by New Hampshire, from which it is separated by the Connecticut River, and on the west by New York. It is therefore the only New England state having no coast line. The western boundary, however, follows the deepest channels of Lake Champlain for more than one hundred miles, and over half the lake belongs to Vermont. Along the northern boundary the state is ninety miles wide; along the southern, but forty. From north to south it is about 150 miles in extent, and its area is 9,564 square miles, 220 square miles in excess of the area of New Hampshire. Montpelier, the largest New England state, is over three times as large as Vermont, which ranks forty-second in size among the states of the Union.

People and Cities. In 1920, when the population was 352,428, Vermont was the

forty-second state in number of inhabitants. By the 1930 census the population had grown to 359,611, an increase of 2 per cent, with an average density of 39.4 persons to the square mile, as compared with the average of 41.3 for the entire United States, ranking it forty-fourth in the Union.

About two-fifths of the foreign-born inhabitants, who number about 50,000, are French-Canadians, and consequently the Roman Catholic Church claims the largest number of adherents of any one denomination. Among Protestant bodies, the Congregational, Methodist, Baptist and Episcopal are the most important.

Slightly more than half the population live under rural conditions. Burlington, with a population of 24,789 in 1930, is the largest city. Rutland, Barre and Brattleboro are next in order. Montpelier (7,857 in 1930) is the capital.

Surface and Drainage. The entire state is mountainous, owing to the presence of the Green Mountain range, which extends from the Canadian border into Massachusetts, and to numerous parallel ranges, which extend in a nearly north and south direction. The Taconic range lies in the southwestern part of the state and is parallel to the main range. There are also several short ranges in the northern and eastern sections. The highest peaks of the main range from north to south are Jay, Sterling, Mansfield, Camel's Hump, Lincoln, Pico, Killington, Shrewsbury, Stratton and Haystack, of which Mount Mansfield, with an altitude of 4,406 feet, is the highest. There are forty-one peaks having an altitude of 3,500 feet or more. All of the mountains of the parallel ranges are comparatively low, have rounded summits and are well timbered. These various ranges are separated by low, broad valleys, through which one or more streams flow and which have fairly fertile soil. The lowest point in the state is the valley of Lake Champlain. In general the surface is a combination of forest-clad hills and mountains, beautiful valleys and sparkling lakes and streams.

The eastern half of the state is drained by the Connecticut River and its tributaries, the most important of these being the Passumpsic, the Waits, the White, the Ottaquechee, the Williams, the Saxtons and the West. The western part of the state is drained into Lake Champlain and thence

into the Saint Lawrence River. The most important streams flowing into the lake are the Missisquoi, the Lamoille, the Winooski and the Otter Creek, the last being the largest river wholly within the state. The southwestern section is drained into the Hudson River by the Battenkill and the Hoosac.

The most important lake is Lake Champlain, more than half of which belongs to Vermont. Other lakes in the Champlain Valley are Bomoseen, Saint Catherine and Dunmore. In the northeastern part of the state is Lake Memphremagog, a portion of which is in Vermont and the remainder in Canada. Southeast of this is Willoughby Lake, renowned for its peculiar surroundings. The lake is about six miles long and lies between two mountains which seem to have been rent asunder in some past geologic age. This region also contains numerous other smaller lakes, frequently known as ponds. All of these bodies of water have become favorite summer resorts.

Climate. The climate of Vermont is subject to extreme and sudden changes. In summer the temperature varies from 65° to 90° in winter it ranges from 18° to 45°. At Burlington the mean annual temperature is 45°. The climate is milder in the Champlain Valley than east of the Green Mountains. During the winter there is often much snow, which in the colder parts of the state covers the ground for three months. The average annual rainfall is thirty-seven inches. The air is clear and pure.

Mineral Resources. The chief mineral wealth of the state is in its quarries. No other state in the Union produces so great a variety or quantity of marble and granite, and Vermont has practically become the center of the marble and granite industries. The value of the annual output of granite exceeds \$3,000,000, the largest quarries are at Barre and Woodbury. The marble industry is chiefly in Rutland County. Roofing and other slate are obtained in large quantities, and the output is of fine quality.

Agriculture. The soil in the valleys along the streams and at the foot of the mountains and hills is usually fertile, though but very little of it compares favorably in this respect with the soils of the great prairie states in the Mississippi Valley. Agriculture is the leading industry of the state. The farms are comparatively small, averaging less than 200 acres, and most of them are tilled by their

owners. Formerly Vermont was known for its production of wheat, oats, corn and potatoes, but since the development of the great agricultural states in the Mississippi Valley, the New England states have been unable to compete in the markets which the Western producers could reach, consequently, in recent years methods and products have been radically changed. Now intensified farming is generally practiced and the raising of wheat has given way to the raising of corn, which is very generally used as ensilage. Dairying is the chief agricultural industry. Excellent qualities of butter and cheese are made, and these find ready market in Boston and other Eastern cities. In the output of these products the state ranks among the first ten. Vermont has always been famed for the excellent breeds of horses produced there, and horses are still raised in large numbers. In some sections the raising of garden vegetables and apples for market is also a profitable industry, and Vermont is unsurpassed in the United States in the quality and quantity of maple sugar produced.

Manufactures. The chief manufacturing industries include dressing stone particularly marble and granite, the manufacture of scales, centered in Saint Johnsbury and in Rutland, the production of flour and other grist mill products, the manufacture of lumber products, and the manufacture of textiles, particularly woolen goods. Since the introduction of electrical power, many small factories have been established within the state, obtaining their power from mountain streams which were previously useless. This has increased the output of manufactures very materially since 1890.

Transportation. The northwestern part of the state finds a ready outlet by water through Lake Champlain and the Richelieu River, but these are closed to navigation during the winter season. Lines of railway traverse the state from north to south, both on the eastern and western sides. There are also numerous cross lines so that every county has good railway facilities, and nearly every town is on a line of railway or within ready access of it. The railways of the state are under the control of the Rutland, the Canadian National and the Vermont Central systems, the total mileage is about 1,075. A number of electric lines connect near-by towns.

Government. The legislature consists of a senate of thirty members and a house



of representatives of 246 members, the latter containing one representative for each town and city within the state. Both senators and representatives are elected every two years. The legislature meets biennially. The executive department consists of a governor, lieutenant-governor, secretary of state, treasurer and auditor, elected by the people for two years. The judiciary consists of a state supreme court of five judges, a superior court of six judges, a chancery court and county courts. The judges of the supreme court, the superior judges and some other officers are elected by the legislature. Women enjoy universal suffrage.

Education. The commissioner of education is at the head of the public school system. The township system is in vogue, in which the town constitutes the smallest unit for school purposes. Supervision is by districts in which several adjoining towns are united. A superintendent who devotes his entire time to the work is appointed for each district. Graded schools are maintained in all the larger towns and villages, most of which have high schools.

The higher institutions of learning are the University of Vermont, at Burlington, with which is connected the State Agricultural College, Middlebury College, at Middlebury, Norwich University at Northfield, Montpelier Seminary, at Montpelier, Goddard Ladies Seminary, at Barre, Saint Johnsbury Academy, at Saint Johnsbury, Vermont Academy, at Saxton's River, and Brigham Academy, at Bakerfield, are among the most prominent academies.

There are several teacher training institutions in Vermont. They are as follows: The University of Vermont—a four-year course, state normal schools at Castleton and Lyndon—two-year and three-year courses, state normal school at Johnson—two-year course.

Institutions. The charitable and correctional institutions of the state include the state penitentiary at Windsor, the woman's reformatory at Rutland, the industrial school at Vergennes, the state asylums for the insane at Waterbury and Brattleboro, the soldiers' home at Bennington, the state sanatorium at Pittsford. There are also ten hospitals under the control of the state authorities.

History. The first white man to enter the territory of Vermont was probably Cham-

Items of Interest on Vermont

About 10,000 of the foreign-born inhabitants came from the British Isles. There are, besides, over 11,000 English-Canadians.

School attendance for 34 weeks is compulsory for children from six to fifteen years of age. No child less than sixteen who has not completed eight grades of school may work in any industrial establishment.

There are about 2,200 public schools in the state and nearly 65,000 enrolled pupils.

Vermont's live stock includes about 250,000 milk cows, 170,000 other cattle, 55,000 horses, 40,000 sheep and 20,000 swine.

The marble quarries were first opened in 1785. They produce half of the marble of the United States.

During the summer months the people in the mountain and lake towns find entertaining the tourists a profitable occupation.

Vermont was the first state to adopt a clause in its constitution prohibiting slavery.

It was the first to be admitted after the adoption of the Federal Constitution.

The present constitution of Vermont was adopted in 1777.

Questions on Vermont

When was Vermont admitted to the Union?

What is the character of the surface of the state?

What is the highest mountain peak?

Name the principal rivers.

How has the introduction of electrical power affected the manufacturing industry?

What are the chief agricultural products?

How does Vermont rank in the production of maple sugar? Of marble?

What are the principal manufacturing industries?

For what products are some of the leading cities noted?

Why is the state a favorite summer resort?

plain (1609), but no settlements were made until 1665, when French trading posts were established on the western border. Vermont was the scene of numerous expeditions by both French and English during the French and Indian Wars. After the middle of the eighteenth century, the territory was a cause of dispute between New Hampshire and New York, each claiming jurisdiction over it, by reason of charters and royal grants. On accounts of the grants of lands made there by New Hampshire, Vermont came to be known as the *Hampshire Grants*. It was finally decided by England that New York had jurisdiction, but the settlers of Vermont, by means of organized militia, known as "Green Mountain Boys," resisted the establishment of the authority of New York. This resulted in several skirmishes.

During the Revolution, Vermont organized its own forces and fought with great effect against the Indians and British in the north. Meantime it set up a claim of independent statehood, and existed as an independent commonwealth for fourteen years, until it was admitted into the Union, March 4, 1791. Its progress during the nineteenth century was consistent. Its government in most respects was rather more democratic than that of other New England states. During the Civil War it furnished its full quota of troops, and it was the scene of the operations of the Fenians in 1864 and 1870. In 1862 an amendment prohibiting the sale of intoxicating liquors was adopted, but was repealed in 1902, local option being substituted.

In proportion to its population Vermont has been second to none in the number of eminent men it has furnished the nation. President Calvin Coolidge was her most distinguished son. Admiral George Dewey and Captain Charles E. Clark of the *Oregon* were noted Vermonters; President Chester A. Arthur, Vice Presidents Levi P. Morton and William A. Wheeler and Justin S. Morrill were also among her sons.

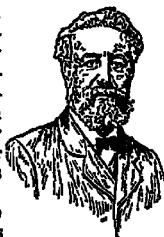
Related Articles. Consult the following titles for additional information.

CITIES	
Barre	Montpelier
Bennington	Rutland
Burlington	
PHYSICAL FEATURES	
Champlain Lake	Memphremagog (lake)
Connecticut River	Taconic Mountains
Green Mountains	
HISTORY	
Allen, Ethan	Green Mountain Boys
Champlain, Samuel	New Hampshire (history)

VERMONT, UNIVERSITY of, a coeducational institution of learning, founded in 1791 at Burlington. In 1862 the university was assured a share in the benefits of the land-grant act passed by Congress, and three years later the Vermont Agricultural College was incorporated with it. "State Agricultural College" is still a part of the legal title of the institution, which is organized into colleges of arts and science, engineering, agriculture and medicine. There is a student enrollment of about 1400, and a faculty of about 200. The library contains more than 160,000 volumes.

VERNE, *larrn*, **JULES** (1828-1905), a popular French romancer. He studied law for some time, but afterward began writing short pieces for the stage. He then began to write stories of adventure. The highly imaginative and fantastic exploits he recounted were given an air of plausibility by the author's manner of presenting them as scientifically possible. His first essay in the vein of the marvelous was *Five Weeks in a Balloon*. This was followed by *Twenty Thousand Leagues under the Sea*, *From the Earth to the Moon*, *Around the World in Eighty Days*, *Michael Strogoff* and *The Mysterious Island*. Most of his books have been translated into the various European languages, and some even into Arabic and Japanese. They will long remain popular for their ingenuity and their lively style.

VERONA, *la ro'nah*, ITALY, next to Venice the most famous city in the Venetian plain. The city is so old that an old Roman amphitheater built by the emperor Diocletian still stands, for many years a ruin, eloquent of the dead past, but now restored. This building is over 500 feet long and is 106 feet high, it was built to seat 20,000 people. In the vicinity of the busiest part of the town is a marble tablet marking the spot where the people believe Juliet lived, and to whose house came Romeo. Through the town runs the swiftly-flowing Adige River, which is spanned by seven bridges. Population, 1931, 154,000.



JULES VERNE

VERONESE, *va ro nay'sah*, **PAUL** (1528-1588), the popular name of Paolo Cagliari, an eminent Italian artist, born at Verona. He studied painting under his uncle, Antonio Badile, and worked successively in Venice, Rome and other cities of Italy, but Venice was his chief residence. Some idea of his talent may be gained from the fact that he was soon recognized as a rival of Titian and Tintoretto. He was an excellent colorist, as were most of the Venetian school, and he was distinguished by the richness and fertility of his imagination. His pictures are exceedingly numerous and varied in subject. Among his masterpieces are *The Marriage at Cana* (now in the Louvre), *The Calling of Saint Andrew to the Apostleship*, *The Rape of Europa*, *The Family of Darius at the Feet of Alexander*, *Adoration of the Magi*, *Consecration of Saint Nicholas and Saint Helena* and *The Vision of the Invention of the Cross*. The last five mentioned are in the National Gallery. Veronese died at Venice in the full maturity of his genius.

VERON'ICA, SAINT, a female saint, who, according to legend, met Jesus Christ bending under the weight of the cross and offered him her veil to wipe the sweat from his brow. The divine features were found miraculously impressed on the cloth, and this veil was brought from Palestine to Rome, where it is still preserved by the canons of Saint Peter's. Milan and other places claim they have the genuine veil.

VERRAZANO, *ver a tsah'no*, GIOVANNI DA (1499-1527), a Florentine navigator, about whose life little is known. About 1523 he made his first voyage of discovery, and in 1524 he voyaged to America, probably touching the coast of North Carolina. He wrote a letter to Francis I, describing this voyage, and this letter is almost the only source of information concerning his discoveries. Some accounts relate that Verrazano was hanged as a corsair, others state that he died while preparing for another expedition to America. The exact truth may never be known.

VERSAILLES, *ver sah'y'*, FRANCE, the capital of the department of the Seine-et-Oise, situated twelve miles southwest of Paris. The town is noted as the location of the magnificent Palace of Versailles, erected in 1661 by Louis XIV and since that time the scene of a number of important and dramatic events in the history of France and of the

world. Here, in 1871, the French signed the hard treaty terms which concluded the Franco-German War; in July, 1919, the victorious allies concluded in the same palace peace terms with Germany at the close of the World War (see VERSAILLES, PALACE OF, VERSAILLES, TREATY OF). From 1871 to 1879 Versailles, was the seat of government of the republic of France. Population, 1931, 66,859.

VERSAILLES, PALACE OF, the famous residence of the Bourbon court and subsequent place of meeting of many important conferences for the adjustment of national and international affairs, including that following the World War. The palace was built as a residence by Louis XIV in 1661, at a cost of \$100,000,000. It was permanently occupied by the court about 1682 and remained its center for a hundred years, or until the overthrow of the Bourbons at the opening of the French Revolution. Since that time it has been used principally as a vast museum, its collections representing the development of French history and art from the time of Clovis to the present day. Especially interesting is a collection representing the era of the Crusades.

The Versailles palace is three stories high, in form a great square with wings at either side and at the back projecting into its surrounding park. It has an imposing façade a quarter of a mile long, above which are inscribed the words, *A toutes les gloires de la France* ("To all the glories of France"). The extensive Versailles gardens are filled with terraces, fountains, decorative ponds and artificially arranged trees and plants.

With the palace are associated the names of Mme de Pompadour, Mme. du Barry and Marie Antoinette. Here was signed the Treaty of 1789 between England, France and Spain on the same day that England recognized the independence of the United States. Here, in 1789, was held the meeting of the States-General which formed the opening act of the French Revolution. During the Siege of Paris, 1870-71, King Wilham of Prussia made his headquarters here, and there he was proclaimed Emperor Wilham I of Germany. Again, in 1919, the interest of the world centered on Versailles, as the conference of the powers adjusted anew the affairs of a world shaken by the four years of the World War, this time with a new diplomacy based on the principles of a League of Nations.



Hall of Mirrors,
Where Treaty
Was Signed

VERSAILLES, TREATY OF, the name of the treaty which formally concluded the World War, negotiated by representatives of the allied powers on the one hand, and those of the central powers, including Turkey, on the other. There were four separate treaty agreements, made with Germany, Austria, Bulgaria and Turkey, respectively. The preliminary work on the agreements was carried on in Paris, but the

name Versailles is applied to the treaty because the actual signing of the agreement with Germany, the head of the Teutonic alliance, took place in Versailles, a suburb of Paris. The German treaty was the first one negotiated, and was signed in the famous Hall of Mirrors, in the Palace of Versailles, in the same room where, in 1871, Wilham I was crowned emperor of Germany at the close of the Franco-German War.

The peace conference began sessions at Paris on January 18, 1919. The United States, the British Empire, France, Italy and Japan were represented by five delegates each; Brazil, Belgium and Serbia were represented by three each, and there were two each from China, Greece, Poland, Portugal, the Czecho-Slovak Republic, Rumania and the kingdom of Hedjaz. Two delegates were allotted respectively to Australia, Canada, South Africa and India, and one to New Zealand, as these British possessions had made great sacrifices for the allied cause. Other minor nations were allowed one delegate each, namely, Siam, Cuba, Guatemala, Haiti, Honduras, Siberia, Nicaragua, Panama and Montenegro. Each delegation acted as a unit. The most influential group consisted of the heads of the American, British, French and Italian commissions—President Woodrow Wilson and Premiers Lloyd-George, Clemenceau and Orlando. They were termed "the big four."

The conference held its sessions in the building of the Ministry of Foreign Affairs, meeting in a splendid reception room originally called Salle d'Horloge (Hall of the Clock). It required nearly six months to ne-

gotiate a treaty with Germany. On May 7, 1919, 109 days after the associated powers had begun their deliberations, German envoys received the terms on which the victorious powers were willing to make peace. The head of the German commission was Count von Brockdorff-Rantzau. A period of fifteen days was allotted the German envoys in which to reply to the terms. An extension of this period was granted, however, and German counter proposals were not delivered until May 29. On June 16, a revised version of the treaty, which had been slightly modified, was tendered the Germans, and on that date the delegation started for Germany. The German National Assembly at Weimar ratified the revised treaty on June 22, and on June 28 the terms were signed in Versailles. It was found necessary to appoint a new commission, the original envoys refusing to sign. A summary of the terms follows:

How Germany Paid. Germany was stripped of all colonial possessions, required to cede certain portions of its European domain, and forced to agree to the payment of heavy indemnities.

Territorial Changes. The following changes in Europe were authorized:

To France—Alsace-Lorraine, 5,600 square miles.

To Belgium—Two small districts (Eupen and Malméd) between Holland and Luxembourg, 332 square miles.

To Poland—Part of Silesia and most of Posen and West Prussia, 12,504 square miles. To league of nations—Mouth of Memel River and internationalized area around Danzig, 729 square miles, basin of the Saar (internationalized temporarily), 735 square miles.

Southeastern third of East Prussia, and Vistula River district, 5,785 square miles, voted to join Poland and Czechoslovakia. North half of Schleswig-Holstein peninsula, 2,787 square miles, voted to join Denmark.

France was given the right to use the output of the Saar coal mines for fifteen years. A vote is to be taken at the end of that period to decide the future status of the Saar valley. (In January, 1935, the people voted to return to German sovereignty.)

The following changes in colonial possessions were authorized:

Togoland and Kamerun—Divided between France and Great Britain.

German East Africa—under the mandate of Great Britain.

German Southwest Africa—under the mandate of Union of South Africa.

German Samoa Islands—under the mandate of New Zealand.

Caroline, Marshall and Ladrone Islands—under the mandate of Japan.
New Guinea—under the mandate of Australia.

Total, about 1,139,800 square miles.

German concessions in China, notably Kiaochau and the Shantung peninsula, were transferred to Japan.

Other Conditions. Germany lost most of its navy and most of its merchant marine, and the army was ordered reduced to 100,000 men. Possession of fourteen submarine cables was ordered relinquished, and sovereignty over the Kiel Canal, the Rhine and other important rivers was lost. Reparation for the damage done by the war thirty-one billion dollars (later reduced, only a little paid, with balance in doubt 15 years later). Luxembourg was freed from the German customs-union. Germany was required to recognize the independence of German Austria and Czechoslovakia, French control in Morocco and the British protectorate in Egypt. Though not admitted as a member, Germany was required to recognize the principle of the league of nations, the provisions for which occupied the first section of the treaty.

Austrian Settlement. The complete text of the Austrian treaty was handed to the Austrian delegation at Saint Germain, France, on July 20, the first section having been tendered on June 2.

There were boundary disputes with Yugoslavia, Czechoslovakia and Italy, but eventually Austria was reduced to the following territories:

PROVINCE	AREA (Sq. m.)	POPULATION AT THE TIME
Lower Austria	7,669	5,298,661
Upper Austria	4,928	858,795
Salzburg	2,768	214,200
Styria	6,327	953,654
Carinthia	3,684	368,589
Tyrol	4,780	506,304
Vorarlberg	1,005	133,212
Burgenland	1,536	296,591
Total	32,352	6,428,236

Austria's army was limited to 30,000 men, and the country was required to guarantee reparations for damages and to assume a portion of the debt of the old empire.

Turkish Settlement. It was the general opinion that the Turkish Empire should be dismembered, such an act would end the Turkish question that had vexed Europe for more than half a century. Some of the powers desired that the Turks should be forced out of Europe altogether, but finally they were permitted to retain Constantinople and Adrianople, with a small surrounding area.

(9,257 square miles) In Asia Turkey was reduced in size practically to the peninsula of Anatolia, ancient Asia Minor. It lost Palestine, Syria, Mesopotamia (Iraq), the Lebanon, and all of Arabia. Besides Anatolia, it holds only a few small islands in adjacent Mediterranean waters.

Bulgarian Settlement The little country of Bulgaria had received acquisitions of territory at the conclusion of the Balkan Wars of 1912-1913, but most of these gains were surrendered after its defeat as an ally of Germany in the World War. The Treaty of Neuilly gave the Southern Dobrudja to Rumania, an area on the south went to Greece and deprived Bulgaria of a sea front on the Aegean, to Yugoslavia it lost territory on the west. Its only outlet by water is on the Black Sea.

Later History. It was the determination of the Allied powers to force Germany to pay for the war, in addition to imposing territorial losses. Beyond the tentative \$33,000,000,000 in indemnities, interest charges would increase the payments to an incredible sum. It was a sullen country that faced its almost impossible task. By 1923 its protests were heeded. A commission headed by Gen. Charles G. Dawes reported in 1924 that payments must not be pressed beyond Germany's ability to pay, which was estimated at about \$600,000,000 a year.

By 1929 a crisis impended in connection with payment of war debts to the United States by European powers, the latter contended that they could pay only as German reparations payments continued, and that Germany could not meet its obligations. Another commission headed by Owen D. Young, fixed the total payments at \$8,800,000,000, installments to run for fifty-eight years. With the rise of Hitlerism, Germany gave notice of repudiation of the entire debt and made a demand for a revision of the Versailles treaty. In 1935 the Hitler regime repudiated the treaty, reoccupied the neutral Rhine zone, and gave notice that it would fully rearm the nation.

VERSE, *vers*, a line of poetry, or, more commonly but less correctly, a stanza composed of several lines. The term is also used, in its broader sense, to mean the measured and cadenced form of speech or composition adopted in poetry. Verse, as simply cadenced lines, is of great antiquity, but the use of rhymed cadences is comparatively modern.

Blank verse is verse in which the lines do not end in rhymes. For the classifications of verse on the basis of meter, see *METER*.

VERTEBRATES, or **VERTEBRATA**, the highest branch of the animal kingdom, comprising all creatures having backbones. Vertebrates are classified as fishes, amphibians, reptiles, birds and mammals. Their bodies are capable of division into head, trunk and tail, and they have typically four limbs (fins in fishes) and an outer skin that consists of more than one layer of cells. The skeleton is internal, and the central nervous system consists of a nerve cord and brain, to which latter the sense organs are connected. Vertebrates also possess a system of sympathetic nerves, a digestive tract, respiratory organs (gills or lungs), special excretory organs, and reproductive organs, usually with separate sexes.

In the long process of evolution these anatomical essentials have been highly developed and variously differentiated. Not till the Tertiary Period, far down the line of the geological ages, did the mammals appear, while man, the youngest of creatures, is the development of the Pleistocene Age. As man advances in scientific knowledge and mechanical skill, penetrating to every part of the world, the other vertebrates become fewer and fewer, except as he domesticates them and raises them in numbers for use as food, the manufacture of clothing or means of transportation.

Related Articles. Consult the following titles for additional information:

Amphibians	Fish and	Reptiles
Birds	Fisheries	Rodents
Carnivora	Mammals	Ungulates
Cetacea	Marsupialia	Zoology
	Primates	

VERTIGO, *vor' te go*, an attack of dizziness, in which stationary objects appear to move in various directions, the person affected finding it difficult to maintain an erect position. It is a common symptom of excessive or defective supply of blood to the brain, as well as of nervous and general debility, though it also frequently arises from the disturbance of the digestive organs. Rapidly whirling the body will produce a severe form of vertigo.

VESPASIAN, *ves pa' she an* (9-79), emperor of Rome. After serving with distinction in Germany and in Britain, as commander of a legion, he was made consul. He afterward became proconsul of Africa; and on the rebellion of the Jews, he was sent with

an army into Judea. He reduced nearly all Galilee and was preparing to attack Jerusalem when he received news of Nero's death (A. D. 68). Then followed the emperors Galba, Otho and Vitellius, and in A. D. 69, Vespasian was himself elected emperor by the army. He left the siege of Jerusalem to his son Titus and returned to Rome. He immediately reformed the discipline of the army, purified the senatorial and equestrian orders and improved the administration of justice. He was the patron of learned men, particularly Quintilian, Pliny and Josephus. He rebuilt a part of the city, restored the capitol and erected the gigantic amphitheater, the ruins of which are still celebrated under the name of the *Colosseum*.

VESPUCCI, *ves poot' che*, AMERIGO. See AMERICUS VESPUTIUS.

VESTA, a Roman divinity, the goddess of the hearth. She was worshiped, along with the Penates, at every family meal, when the household assembled round the hearth, which was in the center of the room. Her public sanctuary was in the Forum, and the sacred fire was kept constantly burning in it by the vestal virgins, her priestesses. A special building, near the temple, was set aside as the dwelling of the vestals. Each community had a hearth, on which was kept constantly alight the sacred fire of Vesta, and colonists setting out from a city took with them some of the old fire to kindle a flame in their new home. Few legends are connected with Vesta.

VESUVIUS, *ve su' vi us*, the only active volcano in Europe, situated on the Bay of Naples, in Italy. Its first recorded eruption took place in A. D. 79, when the city of Pompeii was buried under twenty feet of loose ashes and Herculaneum was covered by a torrent of mud. The elder Pliny, in command of the Roman fleet at Misenum, sailed to the relief of the distracted inhabitants, but was suffocated with them by volcanic vapors. The catastrophe is graphically described by his son, the younger Pliny, in two letters written to Tacitus, long after the event.

Another eruption of Vesuvius occurred in the year of 472, when ashes were carried as far as Constantinople. In 1794 and in 1822 there were also violent eruptions, and a series of lesser eruptions took place in the latter part of the last century, beginning with 1865. The latest eruption occurred in 1906. The mountain is a state of constant activity,

and, being of easy access, has been studied by more scientists and visited by more tourists than any other volcano in the world. An electric railway takes passengers from Naples to within 450 feet of the crater, and under direction of a guide visitors may descend some distance into the crater. An observatory is located on the west shoulder of the mountain, at an elevation of 2,200 feet.

Geologically, Vesuvius is thought to be of recent origin. It is a solitary mountain, with a base about thirty miles in circumference and is surmounted by two summits. The higher one, Vesuvius proper, is the cone from which are emitted the streams of lava. The lower one, known as Mount Somma, partly encloses the active cone. The mountain varies in height according to the amount of material thrown out or carried away by eruptions, averaging about 4,000 feet above the sea level.

Related Articles. Consult the following titles for additional information:

Herculaneum	Pompeii
Naples	Volcano

VEITCH, a common name, rather loosely applied to several genera of climbing plants that are natives of the temperate zones. Many of them have been cultivated as forage plants for ages, and some yield edible seeds. Recently several species have been introduced into the United States for winter forage; the *hairy vetch* makes a good crop yielding from two to four tons of hay an acre. In Europe *sprung vetch*, or *tare*, is more common. The plant has bluish-pink flowers resembling those of the pea, and compound leaves composed of twenty or thirty leaflets.

VETERINARY MEDICINE, the art which deals with the nature, causes and treatment of the disorders of the domestic animals. The first veterinary school was instituted in 1762 at Lyons, France, in 1766 that at Alfort, near Paris, was opened. A similar institution was established at London in 1791, and in the year following, one in Berlin. In the United States veterinary chairs have been added to the University of Pennsylvania, Cornell University and to several other leading universities, as well as to many of the schools of agriculture. Besides these, there are many private schools that give thorough instruction. Recently the requirements of admission to veterinary courses have been materially advanced, and in the better schools four-year courses of study are required.

The veterinarian must have a thorough knowledge of the anatomy and physiology of domestic animals, and of the causes and effects of the diseases common to them. Moreover, he must be a keen observer, for he must rely solely upon his observation in making a diagnosis; the horse or the cow cannot tell him how it feels or where pain is located. All states and the Canadian provinces require every veterinarian to possess a diploma from an approved school, or to take a rigid examination before he is allowed to practice.

One of the most valuable services that the veterinarian renders is the detection and prevention of contagious diseases among domestic animals, and his services for this purpose are usually authorized by the state, which maintains a board or commission, whose duty it is to see that the laws for preventing the spread of contagious diseases among domestic animals are enforced.

The Bureau of Animal Industry, in the United States Department of Agriculture, takes care of veterinary questions that come before the government, and the states and large cities have veterinarians who investigate diseases and attend to the enforcement of the veterinary laws of the districts in which they have power. Important documents are issued for public circulation by the Bureau of Animal Industry and by the experiment stations and boards of agriculture in the several states. In its progress veterinary medicine has kept pace with human medicine.

VETO, from the Latin, meaning *I forbid*, refers to the power of a chief executive to negative any legal measure originating in a lawmaking body. There are several forms of veto power, which may all be included in two main classes—*absolute* and *limited*. In the case of the former the executive action is final, in the case of the latter the legislature may override the executive decision, if an extraordinary majority is in favor of the bill.

In Great Britain the veto of the ruler is absolute, but the power has not been exercised since 1708. In France the veto is limited, of the form known as suspensive, that is, the President may suspend the operation of a law and demand its reconsideration. A similar form of limited veto is in effect in the United States, where the Presidential veto may be overridden by a two-thirds vote of the members of each house of Congress.

VIADUCT, a structure for carrying a waterway or roadway across a valley or low-

land or over a public highway. Viaducts of the older type usually consist of a series of arches of brick work, masonry or spans of steel, but of late they have been largely constructed of reinforced concrete. The viaduct crossing the Kaw River valley, connecting Kansas City, Mo., and Kansas City, Kan., has a length of 8,400 feet. The viaduct at Des Moines, Iowa, used by the Chicago & North Western Railroad, is 2,685 feet in length. Other notable viaducts are those over Tunkhannock Creek and Martin's Creek on the Lackawanna road, the one across the Pecos River in Texas, the viaduct over the White Elster at Goltisch, Saxony, and that at Goktek, Burma. See **BRIDGE**.

VICAR, in a general sense, a representative or deputy authorized to perform the duties of another. In the Church of England a vicar is the priest of a parish, who receives only the smaller tithes, or a salary. In the United States the large city parishes which support two or more churches maintain a vicar for the clerical duties of the chapels.

In the Roman Catholic Church *vicar apostolic* is a bishop who possesses no diocese, but who exercises jurisdiction over a certain district by direct authority of the pope; *vicar-general* is the official assistant of a bishop or archbishop. The Pope calls himself the *Vicar of Christ on earth*.

VICE-ADMIRAL. See **ADMIRAL**.

VICE-PRESIDENT, the official of the United States government who is second in executive authority to the President. The Vice-President is chosen in the same way and for the same length of term as the President. A candidate for Vice-President must be a natural-born citizen of the United States, must have reached the age of thirty-five years and must have been for fourteen years a resident of the United States. He is inaugurated in the Senate chamber at Washington on the same day and immediately preceding the inauguration of the President. His chief duty is to preside over the sessions of the Senate. He is not allowed to vote, except in case of a tie. He becomes President if the President dies or is permanently incapacitated from performing the duties of his office; Tyler, Fillmore, Johnson, Arthur, Roosevelt and Coolidge succeeded to the Presidency in this manner. The salary of the Vice-President is \$15,000 a year.

VICEROY, an official who rules a province or colony in the name of a sovereign, there-

fore, a vice-king. The Governor-General of British India is unofficially called a viceroy, and this title was given in 1936 to Italy's chief in Ethiopia.

VICKSBURG, Miss., third largest city in the state and the county seat of Warren County, forty-three miles west of Jackson, on the Mississippi River, a few miles below the mouth of the Yazoo, and on the Yazoo & Mississippi Valley and the Alabama & Vicksburg railroads, the city has an airport, and the river traffic is large. The city is situated on a high bluff overlooking the river. Near it is the Vicksburg National Military Park, which restored the Vicksburg battle ground as it was in 1863. The principal buildings of the city are the courthouse, the Federal building and the Mississippi State Charity Hospital. The educational institutions include all Saints College, a girls' junior college, the city public schools and four parochial schools.

Vicksburg is the center of a large cotton-raising district and is noted for its cotton trade. It has numerous manufacturing establishments, including cottonseed-oil mills, saw and lumber mills, box, ice and boat-oar factories, boiler works, car shops, ice plants, cotton compresses, a mattress factory, the city also has repair shops of the Yazoo & Mississippi Valley Railroad.

The town was laid out on the plantations of John Lane and William Vick, and the city was incorporated in 1840. During the early part of the Civil War it was strongly fortified, and after a long siege it was surrendered to General Grant on July 4, 1863. Population, 1930, 22,943.

VICTOR EMMANUEL II (1820-1878), king of Sardinia, the son of Charles Albert. His aptitude for a military career became evident when he commanded the Savoy brigades against Austria (1848-1849), and he distinguished himself in the Battle of Goito by his reckless valor. After the Battle of Novara his father abdicated, and Victor Emmanuel ascended the throne of Sardinia. He had then to negotiate with Austria under most unfavorable circumstances, but he steadily refused to give up the principle of representative government in the Sardinian constitution, and thus gained for him the good will of the Italian people. Under the advice of his celebrated minister, Cavour, he regulated the finances, reorganized the army and secularized the church property, for which he was excommunicated by the Pope.

Victor Emmanuel took part in the Crimean War against Russia, and in 1859, assisted by France, he renewed the contest with Austria, winning the battles of Magenta and Solferino. By the Treaty of Villafranca and the Peace of Zurich, which followed these successes, Lombardy was added to his dominions, but he had to cede Savoy and Nice to France. Parma, Modena and Tuscany now became united to Sardinia, and Garibaldi's successes in Sicily and Naples brought the whole of Southern Italy over to Victor Emmanuel. Early in 1861, he assumed the title of king of Italy. By the Peace of Vienna (1866) Austria ceded Venetia, and on the withdrawal of the French garrison from Rome in 1870 that city annexed itself to Italy. The king entered Rome on July 2, 1871, and took up his residence in the Quirinal. He was succeeded by his son Humbert.

Related Articles. Consult the following titles for additional information:
Cavour, Count Humbert I
Crimean War Italy (history)
Garibaldi, Giuseppe Sardinia, Kingdom of

VICTOR EMMANUEL III (1898-), king of Italy, son of Humbert I and Queen Margherita. He entered the army in 1887 and was steadily advanced in rank. At the coronation of Nicholas II of Russia, in 1896, and at Queen Victoria's jubilee, in the following year, he was present as his father's representative. In 1896 he married Princess Helena of Montenegro. When his father was assassinated in 1900, he succeeded to the throne, and he proved a just and liberal ruler.



The king assumed active command of the Italian armies on the Austrian front in the World War, and his attitude strengthened him in the esteem of his subjects. Though the rise of the Fascist regime under Mussolini made him a secondary figure, his personal popularity did not in the least abate.

VICTORIA (1819-1901), a beloved Queen of the United Kingdom of Great Britain and Ireland, and Empress of India. She was the only child of Edward, Duke of Kent, fourth

VICTOR
EMMANUEL III

son of George III, and was born at Kensington Palace. The duke died when Victoria was only eight months old, and she was brought up by her mother with exceptional prudence and care. Upon the death of her uncle William IV, June 20, 1837, she ascended the throne and was crowned at Westminster, June 28, 1838. The English people knew little of their young queen, who had been brought up in seclusion, but she soon proved herself possessed of the clear judgment and moderation which a sovereign needs, and of a thorough goodness which won the hearts of her subjects.

During the reign of Victoria there were eighteen changes of government, the following Premiers taking office at the dates given: 1835, Melbourne; 1841, Peel; 1846, Russell; 1852, Derby; 1852, Aberdeen; 1855, Palmerston; 1858, Derby; 1859, Palmerston; 1865, Russell; 1866, Derby; 1868, Disraeli; 1868, Gladstone; 1874, Disraeli; 1880, Gladstone;

1885, Salisbury; 1886, Gladstone; 1886, Salisbury; 1892, Gladstone; 1895, Salisbury. The leading events of the reign were the confederation of Canada, the Opium War in China; the abolition of the Corn Laws, under the administration of Sir Robert Peel, the successive steps in parliamentary reform, the enfranchisement of the Jews, the Catholic Emancipation act, the assumption of the government of India by the Crown, the Crimean War; the wars with Afghanistan, Abyssinia, the Zulu tribes and Egypt, the long struggle on the Irish home-rule question, the beginning of the South African War, and the Australian federation.

In February, 1840, Victoria was married to her cousin, Prince Albert of Saxe-Coburg-Gotha, and the marriage proved an unusually happy one. Four sons and five daughters were born to the royal couple. Victoria, Princess Royal, born in 1840, married in 1858 to Frederick William, afterward German Emperor, died in 1901, Albert Edward, Prince of Wales, born in 1841, married

to Alexandra, daughter of the king of Denmark, succeeded to the throne on the death of his mother, Alice, born in 1843, married in 1862 to Prince Frederick William of Hesse, died in 1878; Alfred, born in 1844, married in 1874 to Marie, daughter of the Czar of Russia, died in 1901, Helena, born in 1846, was married in 1866 to Prince Christian of Denmark, Louise, born in 1848, was married in 1871 to the Marquis of Lorne, Arthur, born in 1850, was married in 1879 to Princess Louise Marguerite of Prussia; Leopold, born in 1853, married in 1882 to Princess Helen of Waldeck, died in 1884; Princess Beatrice, born in 1857, was married in 1885 to Prince Henry of Battenberg. In 1861 the Prince Consort died, and the queen withdrew from social life.

During the reign of Queen Victoria, Great Britain enjoyed a long era of uninterrupted prosperity, peace and contentment prevailed at home, and, with very rare exceptions, relations of amity were maintained with foreign powers. In length her reign was unprecedented in the world's history. It is true that Louis XIV of France ruled over a longer period than she, but subtracting the years during which he was under a regent, his responsible tenure of the crown was shorter than hers. Although George III nominally ruled sixty years, owing to his insanity a part of his reign was also under a regent.

In 1887 the people of Great Britain and the colonies celebrated the golden jubilee, or fiftieth year of Queen Victoria's reign. In 1897 they celebrated the diamond jubilee, with ceremonies more imposing than had ever attended any similar event. Representatives of all the colonies were present, and a grand procession, viewed by millions, moved through the streets of London. Victoria died January 22, 1901.

Related Articles	Consult the following
titles for additional information	
Corn Laws	India (history)
Crimean War	South African War
Great Britain (history)	

VICTORIA, a state of the Australian Commonwealth, situated in the southeastern part of the continent. Victoria is next to the smallest state of the Commonwealth, but is second in population. Only Tasmania has a smaller area, and New South Wales is the only state with more inhabitants. It is bounded on the north by New South Wales, on the south and southeast by the Indian



VICTORIA

Ocean and on the west by South Australia. Its area is 87,884 square miles, or a little less than the areas of Virginia and North Carolina combined. It has about 600 miles of sea coast, with a considerable number of bays and indentations, especially about the middle, where Port Phillip Bay, with an area of 875 square miles and an entrance barely two miles wide, affords shelter sufficient for the largest fleet.

Surface and Drainage. The interior, though diversified by mountains, is chiefly distinguished by vast, unwooded plains, mostly occupied as pasture. There is one principal mountain range, a portion of the Great Dividing Range of Eastern Australia, running from east to west through the state, with various offshoots. The eastern portion of it, called the Australian Alps, with numerous northern and western ramifications, rises to 6,500 feet in Mount Bogong and to 6,100 feet in Mount Hotham, and has several other peaks exceeding 5,000 feet in height. The most westerly portion, called the Grampians, runs north and south, and in Mount Willem reaches a height of 5,600 feet. The Grampians and the Australian Alps are connected by such ranges as the Pyrenees and Hume Range, containing numerous cones and extinct craters. This is the region of the gold fields. The rivers are numerous, but they are generally small and dry up in summer, leaving the country parched. The chief is the Murray, which rises in the Australian Alps and forms the northern boundary of the state for 980 miles. It is 1,300 miles long and is navigable for several hundred miles.

The climate of Victoria is temperate, but liable to sudden changes, and hot winds blow at intervals from November to February, causing great discomfort. The hottest period is in January and February, when the thermometer sometimes rises to 108° in the shade.

Industry and Trade. Victoria has produced more gold than any other Australian state, but at present she is far outvalued in that respect by Western Australia. Tin, antimony, copper and coal are also worked.

General farming is quite extensively followed. The chief crops among the cereals are wheat, oats and barley. Hay is grown, and forage crops are also raised. Among fruits, grapes take the lead, and considerable attention is given to the manufacture of wine. Stock raising is important, and wool

growing is the chief branch of agricultural industry. The state has over 17,000,000 sheep, and the annual output of wool averages over 145,000,000 pounds.

The manufacturing industries are quite generally distributed, and include the manufacture of textiles, machinery, food preparations, butter and cheese and malt and spirituous liquors.

Most of the commerce is with Great Britain, and in its foreign trade Victoria is the second state of the commonwealth. The chief exports are wool, gold, dairy products and wheat. Railway lines extend to all the most important trade centers and connect these directly or indirectly with Melbourne, the chief city and commercial port. In all, there are about 4,600 miles of railway in the state.

Government. The governor, who is the chief executive officer, is appointed by the British sovereign. The legislature consists of a council of thirty-four members, who are chosen for six years, and an assembly of sixty-five members, elected for three years. Suffrage is granted to men and women on equal terms. Melbourne, the capital, is the second largest city of Australia, following Sydney. Population of the state, 1927, 1,696,670, in 1933, 1,820,360.

Related Articles. Consult the following titles for additional information:

Australia	Melbourne
Ballarat	Murray River

VICTORIA, B. C., capital of the province, is situated on the southeastern extremity of Vancouver Island, on the Strait of San Juan de Fuca, seventy-five miles northwest of Seattle, Wash. It is within three miles of Esquimalt, a naval base with one of the finest harbors on the Pacific coast. The city is well laid out and has good streets, excellent roads connect it with the surrounding country. The public buildings include the parliament house, the government offices and the provincial museum and library, the city hall, the courthouse, a marine hospital, the Anglican Cathedral and exposition buildings. Victoria is a favorite residential city. It has lumber mills, and is also the lumber distributing center for Vancouver Island. It also has a large trade in salmon. Originally a post of the Hudson's Bay Company, it was incorporated as a city in 1862, and until the founding of Vancouver was the largest Canadian city on the Pacific coast. Its foreign trade is large, great steamships connect with

the Orient in regular sailings Population in 1931, 39,082

VICTORIA CROSS, the most highly-prized British military and naval decoration, instituted as a recognition of valor in the presence of the enemy at the close of the Crimean War in 1856 It is granted to soldiers and sailors of any rank, including native officers and men of the Indian army. Up to 1913 only 522 crosses had been awarded; this number was considerably increased during the World War. The cross is the more valuable because it is awarded sparingly, and only for the most conspicuous acts of bravery and devotion to the Empire

VICTORIA FALLS, a celebrated cataract in the Zambezi River, in Rhodesia, South Africa, discovered by Livingstone in 1855 and named by him in honor of Queen Victoria After flowing for a long distance over a rough and broken plateau, covered with brush and stunted trees, the Zambezi plunges suddenly into a chasm nearly 400 feet deep The falls, 3,000 feet in width and 360 feet in height, are the most magnificent in the world At low water the fall is broken by projecting rocks and is described by an observer as resembling a film of delicate lace, but when the river is swollen during the rainy season, an unbroken sheet of water is hurled over the ledge, forming a cataract unequalled elsewhere in the world The roar of the falls can be heard for twenty miles, and the cloud of spray thrown into the air is visible for ten miles Because of this cloud, the natives named the cataract *Mosi-oa-tunya*, which means *roaring smoke*

Below the cataract the Zambezi flows for a long distance through a narrow gorge, with nearly perpendicular walls of basalt Just below the falls the Cape-to-Cairo Railway crosses the river on a magnificent steel bridge, 600 feet long and 420 feet above the water, it is the highest structure of the kind in the world From this bridge a magnificent view of the falls is obtained

VICTORIA NYANZA, the largest lake in Africa, having a surface area of 26,000 square miles and after Lake Superior the largest body of fresh water in the world. It was discovered in 1858 by Captain Speke and named for Queen Victoria (*nyansa* is the local word for *lake*) It lies about 600 miles from the eastern coast and is crossed by the equator It is fed by several streams, the most important being the Kagera to the

west, and drains an area of 92,000 square miles, where there is an annual rainfall of seventy-five inches. It is the principal source of the Nile River. As the Nile issues from the lake it forms the Rapon Falls, which are about 1,200 feet across The lake is rocky and shallow and is dotted with islands Port Bell, Entebbe and Jinja are the principal ports

VICUNA, *ve coo'nyah*, a small animal of the camel family, somewhat resembling a wild goat or an antelope, which inhabits the Andes Mountains in South America. It is economically valuable because of its soft, silky, brown wool, which is of better quality even than that of the alpaca. It is commonly seen in herds of from six to fifteen females and one male The animals are very timid, and have never been domesticated

VIENNA, *ve en'nah*, now officially *Wien*, the capital and largest city of Austria, before the great war the fourth city in Europe in population, and one of the most pretentious capitals in the world. The day of Vienna's outstanding influence is past By the terms of the peace treaty of 1919 Austria was reduced to a state of less than 8,000,000 inhabitants, and out of the old domain were erected several independent states with capitals of their own. It is not to be expected that the new Austria can support a capital of over 2,000,000 inhabitants, which was the population of Vienna at the outbreak of the war

The city was formerly the center of Austrian social life and gaiety, of the national administration, of art, education and music, of banking, commerce and finance As a result of the disastrous war the wealth of Vienna disappeared, as did the court and the prestige of the aristocracy The people who were left were burdened with debts and physically weakened by the privations of the war

General Description The city is situated on the south bank of the Danube, 330 miles south-southeast of Berlin and 630 miles east of Paris The site is picturesque, for the plain on which the city was built is bordered by mountains, whose bases are covered with magnificent forests A branch of the Danube, known as the Danube Canal, traverses the city from northwest to southeast. This canal is spanned by many bridges, and by the construction of a lock a section of it has been made into a capacious harbor

Vienna is built upon the plan of the old European cities, containing an inner, or central city, surrounded by suburbs, which are now incorporated in the city and divided into districts. The old town, or Innere Stadt, occupying the center of the city, was formerly enclosed by a wall and fortifications. In 1858 these were removed, and a magnificent boulevard, the Ringstrasse, was erected upon their site. This is one of the finest streets in Europe, and upon it are found most of the important public buildings of the city. In the newer parts the streets are broad, and there are a number of boulevards and parks. Chief among these is the Prater, in the southeastern quarter, having an area of over 4,000 acres. The streets, parks and bridges are decorated with numerous statues and monuments. The buildings are noted for their beauty and elegant ornamentation, making Vienna, from the standpoint of architecture, one of the finest cities of the world.

Buildings and Monuments. In the center of the Innere Stadt is the Cathedral of Saint Stephen, which dates from the thirteenth century and is one of the finest Gothic structures in Europe. Other buildings of importance in and about the Ringstrasse are the imperial palace, in the southeastern quarter, noted for its age and size, rather than for its beauty, the townhall, a magnificent building adorned with many statues, the imperial museums of natural history and of art, with a monument of Maria Theresa between them, the houses of parliament, the palace of justice, the imperial opera house, a number of churches, noted for their statuary and paintings and the University of Vienna, with its numerous structures. Among the noted monuments not already mentioned are the monument to Mozart, the equestrian statues of Archduke Charles and Prince Eugene of Savoy and the monument to the Archduchess Christine.

Institutions. The educational institutions include the University of Vienna, a polytechnic institute, an agricultural college, a geological institute, the academy of sciences, the conservatory of music and the military geographical institute, besides a large number of trade schools, which prepare their students for such occupations as printing, bookbinding and other mechanic arts. The imperial library contains 900,000 volumes, besides a large number of manuscripts and engravings, and the library of the university has 650,000

volumes. These are supplemented by other libraries in the various institutions. The collections in the academy of art and the museums are among the best in the world, while the armory contains a large collection of weapons and other instruments of war. The chief charitable institution is the general hospital, one of the largest and most famous institutions of its kind in the world, before the war medical students were drawn to it from all over Europe and America. There are also an asylum of the insane, and a number of smaller hospitals and homes for the blind and the deaf and dumb.

Industries. Vienna is situated at the crossing of the great commercial routes from London, Berlin and Paris to Constantinople and from Petrograd to Rome. Its situation made it an important industrial and commercial center. Among the leading industries were the manufacture of silks, woollens and other textiles, clothing, machinery, railway cars, locomotives and supplies, musical instruments, furniture, scientific and surgical instruments, pottery, jewelry, leather goods, malt liquors and numerous other products. Before the war the city had an extensive trade with the surrounding country and with the leading commercial centers of Europe, but during the war this trade was almost entirely cut off.

History. Vienna occupies the site of an ancient Roman camp, known as *Vindobona*. It first became prominent as the capital of the duchy of Austria, and for about 150 years from the middle of the sixteenth century it was the capital of the German Empire. It was the seat of the celebrated Congress of Vienna that reorganized Europe after the fall of Napoleon. Population in 1911, 2,081,498, by the official census of 1934 it was given as 1,874,581. See AUSTRIA, AUSTRIA-HUNGARY, WORLD WAR, VERSAILLES, TREATY OF.

VIENNA, CONGRESS OF, a convention of representatives of European powers which assembled late in 1814 to reorganize the political system of Europe after the close of the Napoleonic wars. It was a brilliant assemblage of crowned heads, prominent diplomats and statesmen, of whom Czar Alexander I of Russia, Prince Metternich, the Austrian Minister of State, Prince Talleyrand of France, Castlereagh and Wellington of Great Britain and Hardenberg and Humboldt of Prussia were among the most powerful

By the provisions of the Congress of Vienna, France was deprived of the territory conquered by Napoleon, Holland and Belgium were united into a single kingdom under the House of Orange, Norway and Sweden were joined under a single ruler, one of Napoleon's generals, and the independence and neutrality of Switzerland were guaranteed. The German states were loosely confederated under a diet at Frankfurt. In Italy the old governments, consolidated under Napoleon, were restored. Poland was reestablished as a constitutional kingdom dependent upon Russia. Great Britain found compensation in the extension of its colonial possessions.

The Congress of Vienna is criticized for its blindness to the spirit of nationalism that had been awakened throughout Europe by the events of the French Revolution. It defined boundaries arbitrarily, without consulting the peoples concerned, thus laying the basis of many disputes and future wars. The diplomatic method known as the balance of power, brought into prominence by this Congress, led to unending international complications that finally resulted in the bursting forth, in 1914, of the World War, the most widespread and violent conflict in all history.

VIKINGS. See **NORTHMEN**.

VILLA, *ves' ya*, FRANCISCO, or **PANCHO** (1877-1923), a Mexican revolutionist and bandit, born at Las Nieves. His real name is DOROTEO ARANGO; he called himself *Villa* after joining the Madero revolution. He had no education, and became a bandit and outlaw at a early age, long before the Madero uprising. President Diaz had offered a reward for his capture. In 1914 he joined Carranza in a revolution against Huerta, and the next year he started a revolution against Carranza, gaining control of parts of the states of Sonora, Chihuahua and Sinaloa.

In March, 1916, Villa invaded New Mexico, and raided the town of Columbus. United States troops under Pershing made an expedition of 600 miles into Mexico to capture Villa, but he fled to the mountains and escaped. After the troops were withdrawn, in 1917, he resumed his depredations, but did not invade the United States again during the period of the World War. In the summer of 1919, however, his attitude became very threatening, and an American patrol crossed the border. In 1920, after the deposal of Carranza, Villa came to terms with the new government, which gave him

a money allowance and a military command. See **MEXICO**, UNITED STATES; **CARRANZA**.

VILLEINS, *vil' lins*, a class of feudal serfs, who were allowed to hold portions of land at the will of their lord, on condition of performing menial and non-military services. It frequently happened that lands held in villenage descended in uninterrupted succession from father to son, until at length the occupiers or villeins became entitled, by prescription or custom, to hold their lands so long as they performed the required services. And although the villeins themselves acquired freedom, the villen services were still the condition of the tenure. These customs were preserved and evidenced by the rolls of the several courts in which they were entered, or by the immemorial usage of the several manors in which the lands lay. And as such tenants had nothing to show for their estates but the entries into those rolls, or copies of them, they at last came to be called *tenants by copy of court roll*, and their tenure was known as a *copy-hold*. See **FEUDAL SYSTEM**.

VIL/L, minute projections covering the mucous lining of the small intestine. Each villus contains an artery, a vein, a capillary, or a network of capillaries, and lacteal. The function of the villi is to absorb the nutritious matter from the digested food in the intestines, after which the digested fats are carried to the thoracic duct, and the sugars, water, proteins and inorganic salts are carried by the portal vein to the liver. In constipation the villi are submerged by waste matter, and the absorption of food matter by them is made difficult or impossible.

VIL'NA, POLAND, a city of about 200,000 population, situated on the navigable Vilna River northeast of Warsaw. Vilna is an old city, dating from the tenth century. Before the annexation of Lithuania by Russia in 1795, it was the capital of that country. In April, 1919, Vilna was seized. When the new Lithuania (which see) was organized after the World War, it claimed Vilna, but Poland seized it, and this incident nearly led to war. The city seems destined to remain Polish.

VINCENNES, *vin sens'*, IND., one of the oldest towns in the United States, the county seat of Knox county, 117 miles southwest of Indianapolis, on the Wabash River and on the Baltimore & Ohio Southwestern, the Cleveland, Cincinnati, Chicago & Saint Louis,

the Chicago and Eastern Illinois, and the Pennsylvania railroads. It is in an agricultural, lumbering and coal-mining region and has manufactures of flour, lumber and clay products, novelties, paper, stoves and farm and mining implements.

It is the seat of the Vincennes University, which is a junior college, a cathedral library and a public library. Other interesting features are the house in which William Henry Harrison lived when he was governor of the territory, the old legislative house, the courthouse, the city hall, the first in Indiana, the Federal building, the Vincennes Sanatorium, Harrison Park and the George Rogers Clark Memorial.

Vincennes is located on the site of an ancient Indian village, called Chip-kaw-kay. The French erected a fort here about 1702, and a permanent settlement soon grew up. It was first called "The Post," but was later given its present name, in honor of its founder, François Morgan de Vinsenne. The place was taken by the British in 1783, was captured by Virginia troops under Colonel George Rogers Clark in 1779 and was turned over to the United States in 1783. It was the capital of Indiana Territory from 1801 to 1816 and was made a city in 1856.

Population, 1920, 17,210, in 1930, 17,564, a gain of 2 per cent.

VINOENT, GEORGE EDGAR (1864-), an American educator and sociologist, son of Bishop John H. Vincent, born at Rockford, Ill. After his graduation from Yale University in 1885 he traveled in Europe and the Orient and then engaged for a time in journalistic and literary work. In 1888 he became vice-president of the Chautauqua system and in 1907 president of the Chautauqua Institution. At the same time he was a member of the faculty of the University of Chicago, having been appointed in 1894. In 1904 he was made professor of sociology, from 1900 to 1907 he was dean of the junior colleges, and from 1907 to 1911, dean of the faculties of arts, literature and science. In 1911 professor Vincent became president of the Uni-



GEORGE E. VINCENT

versity of Minnesota, and in 1917 resigned from that post to accept the presidency of the Rockefeller Foundation (which see), from which post he retired in 1929. He wrote voluminously on educational topics for many years.

VINCENT, vin'sent, JOHN HAYL (1832-1920), a Methodist Episcopal bishop, best known as one of the founders of the Chautauqua Assembly movement. He was born at Tuscaloosa, Ala., and was educated at Lewisburg (Pa.) Academy and at Wesleyan Institute, Newark, N. J. Entering the New Jersey Conference in 1853, he preached four years in the East, and was then transferred to the Rock River Conference, in Northern Illinois. In 1865 he established the *North-west Sunday-School Quarterly*, and the following year *The Sunday-School Teacher*. From 1868 to 1894 he was corresponding secretary of the Sunday-School Union of his denomination and editor of its publications. Ten years previous to the latter date he had helped to lay the foundations of Chautauqua Institution and in 1878 had become its chancellor. He was elected bishop in 1888, and twelve years later was appointed resident bishop in Europe, remaining abroad four years and then returning from the active episcopate in 1904. His publications include *The Chautauqua Movement*, *The Church School and Its Officers*, *Studies in Young Life*, *A Study in Pedagogy* and *Family Worship for Every Day in the Year*. See CHAUTAUQUA INSTITUTION.

VINOI, vin'che, LEONARDO DA (1452-1519), one of the foremost scholars of the Italian Renaissance and one of the greatest artists of all time. His place in history is unique, not only because of the high quality of his art, but because of the versatility of his genius and his intellectual influence on his contemporaries. Such a combination of artistic and scientific capacities has not been known in any other man. Leonardo was distinguished not only as a painter, but as a sculptor, an architect, a musician and an engineer. As a philosopher and man of science he was the forerunner of Galileo, Bacon and Descartes. He was acknowledged the greatest physicist of the fifteenth century. He "united a remarkable knowledge of mathematics with the most admirable intuition of nature," and he "anticipated the grandest discoveries of modern science," says a modern scholar.

Leonardo was born at the small town of Vinci, near Florence, the son of a Florentine notary. In his youth he was distinguished for his great personal beauty, physical strength and eagerness for knowledge. After studies with the celebrated painter and sculptor Verrocchio he became an independent artist, and from the age of twenty onward enjoyed the most distinguished patronage; Lorenzo de' Medici, Ludovico the Duke of Milan and Francis I of France treated him with the highest honor. As architect, engineer, painter, sculptor and decorator, he received numerous commissions, and in everything he undertook he aimed at perfection.

His supreme masterpiece, *The Last Supper*, painted on a wall of the monastery of Santa Maria delle Grazie, at Milan, represents Christ, seated with his disciples, at the dramatic instant following His announcement that one of the twelve should betray Him. In characterization and dramatic and spiritual significance it surpasses all other treatments of the same subject. Unfortunately, the picture has been exposed to dampness and smoke, and these elements, together with clumsy attempts to restore it, have obliterated much of its original beauty. The most celebrated of Leonardo's easel pictures, that known as *Mona Lisa*, is the portrait of a prominent Florentine lady, perhaps the most famous portrait in the world (see PAINTING). *The Virgin of the Rocks*, *The Virgin, Saint Anne and Christ* and *John the Baptist*, all in the Louvre, are his other chief masterpieces. Leonardo spent his last years in France in the service of Francis I. He wrote a celebrated treatise on painting.

VINEGAR, a sour liquid whose active principle is acetic acid, is made from the juices of fruits and vegetables and from almost any other liquid that will ferment. It is used as a condiment and in the pickling and preserving of foods. The vinegar of commerce is made from wine, cider or malt exposed to the air, usually at a heightened temperature until the alcohol which it contains turns into acetic acid. By far the largest part of the vinegar used in the United States is made from cider. Ohio, New York, Michigan and Missouri lead in the industry.

Cheap grades of vinegar are usually given their sour taste by the addition of sulphuric acid. This adulterated product is very unhealthful, and should not be purchased. The presence of the acid can be detected by

boiling a mixture of vinegar and potato starch, and when this becomes cool, adding a small quantity of iodine. If the vinegar is pure, the mixture will turn blue on the addition of the iodine, if sulphuric acid is present, the color will remain unchanged.

VINLAND, the name given to that part of North America which was visited by Norsemen several centuries before Columbus made his famous voyage. As early as the tenth century a Norwegian viking, Bjarm Herjulfson, was driven by storms to the mainland near Greenland, and in the year 1000 Leif Ericson landed on the continent, probably somewhere between Delaware and Labrador. He named the region Vinland (also spelled Vineland) because of the numerous wild grapevines there. It is believed, however, that the Norsemen did settle at some point in America and that they built homes, which they deserted because of the hostility of Indians. The former popular belief that the old mill at Newport and the Dighton Rock are evidences of their visit has long since been discarded, the former having been erected by an early governor of Rhode Island and the latter being the work of Algonquian Indians.

VIOL, a class of ancient musical instruments, which may be regarded as the precursors of the modern violins. They were fretted instruments, with three to six strings, and were played with a bow. There were three instruments in a set, differing in pitch; these were the treble, tenor and bass viols, and in concerts they were commonly played in pairs—two treble, two tenor and two bass. The bass viol, or *viol da gamba*, developed into the modern *violinello*.

VIOLET, the popular name given to a genus of plants, of which there are many species. They are favorite flowers in all northern and temperate climates, and many of them are among the first to make their appearance in the spring. The greatest favorites are the common sweet violet and the heart's-ease, the former being especially esteemed for its fragrance. The well-known pansies, so common as garden flowers, are but varieties of one species, produced by cultivation. In different localities, various species are called johnny-jump-ups. The so-called dog-tooth violet belongs to the lily family.

VIOLIN, a musical instrument, consisting of four catgut strings, the lowest of

which is covered with silvered copper wire, stretched, by means of a bridge, over a hollow wooden body, and played with a bow. It is considered the most perfect of musical instruments, on account of its capabilities of fine tone and expression and of producing all the tones in any scale in perfect tune. It forms, with the viola, the violoncello, or bass violin, and the double bass, the main element of all orchestras.

The principal parts of the violin are the *scroll*, or *head*, in which are placed the pins for tuning the strings, the *neck*, which connects the scroll with the body, and to which is attached the *fingerboard*, upon which the strings are stopped by the fingers of the left hand, as it holds the neck in playing, the *belly*, over which the strings are stretched, and which has two f-shaped sound holes, one on each side, the *back*, or under side, the *sides*, or *ribs*, uniting the back and belly, the *tailpiece*, to which the strings are fastened, and the *bridge*. The back, neck and sides are generally of sycamore, the belly of deal, the fingerboard and tailpiece of ebony. Almost all the pieces are put together with glue.

The four strings of the violin are tuned at G, on the upper space of the base staff, D, A, E, reckoning upward. Every intermediate semitone in a compass of $3\frac{1}{2}$ octaves may be produced by stopping the strings with the fingers, and the compass may be almost indefinitely extended upward by touching the strings lightly. The *viola*, or tenor violin, has four strings, tuned to G (in the second space of the base staff), D, A, G, reckoning upward, it is an octave higher than the violoncello and a fifth lower than the violin.

The art of violin-making reached its highest development in the sixteenth, seventeenth and eighteenth centuries. The greatest of the world's violin makers, Stradivarius, Amati and Guarneri worked at Cremona, Italy. Very fine instruments were also made at the same time in France and Germany.

VIOLONCELLO, *vi o lon chel lo*, also called **CELLO** (*chel lo*), a large musical instrument of the violin class, intermediate between the violin and the double bass. The performer rests one end of the instrument on the floor between his knees, and supports the neck with his left hand. There are four gut strings, the two lowest covered with silver wire. They are tuned in fifths—C, G, D, A. The instrument has a compass from G to A, .

The higher notes are in the treble clef, the lower in the bass. Although the instrument is much larger than the violin, the cello bow is shorter. Comparatively little solo music has been written for the cello.

VIPER, the name applied to a family of venomous reptiles found in tropical and temperate regions of Europe, Asia and Africa. This snake has a flat, triangular head, which in most species is covered with scales. The pupil of the eye is like a cat's eye. The common viper is rarely more than two feet long, is usually brownish-yellow, with black triangular spots on its sides and zigzag lines on its back. Its bite, as a rule, is not fatal, but may cause pain and fever. It is the only poisonous snake in Great Britain. Another species, called the *sand viper*, having a small fleshy horn on its nose, is found along the shores of Mediterranean countries. In Africa occur the *death adder*, *puff adder* and *saw viper*. The *horned viper* of the Egyptian desert which preys at night and burrows in the sand during the day, is much feared on account of its bite, which is usually fatal. The largest and most deadly of all vipers is *Russell's viper* of India. It is five feet long, and its poison is invariably fatal.

VIRCHOW, *veer'ko*, RUDOLF (1821-1902), a German physician and pathologist, born in Pomerania. He studied medicine at Berlin and early became famous as a lecturer on pathological anatomy at Berlin University. His advanced liberal opinions during the movement of 1848 induced the government to deprive him, temporarily, of his appointment. In 1849 he accepted a chair at Wurzburg, where he remained seven years, at the end of which time he returned to Berlin as professor in the university and director of the pathological institute attached to it. In 1858 he published *Cellular Pathology*, in which he showed that pathological tissues are a collection of cells. Virchow rendered immense service to medical science by his discoveries in regard to inflammation, ulceration, tuberculosis and other diseases, and he has had great influence on the whole of modern medicine, including hospital reform and sanitary science. He was a voluminous writer, not only on scientific, but also on political subjects, and many of his works have been translated into the English and other European languages.

VIREO, a common name of a small family of birds, whose plumage is generally of a

greenish shade. They are sometimes called greenlets, and about a dozen species are found in the United States. Many of the birds are singers, the songs of the several species varying considerably. The birds feed exclusively upon insects, and thus render a distinct service to the farmer. The nests of all are similar, being cup-shaped and constructed of ribbonlike materials.

The best-known species in the United States is the *red-eyed vireo*. It is about six inches long, has bright olive-green back and tail, and a double line of ash and white over the eye, the iris of which is red. The *yellow-throated vireo* has a bright, olive-green back and yellow throat and breast. The *warbling vireo* is of plain plumage, but has a charming song.

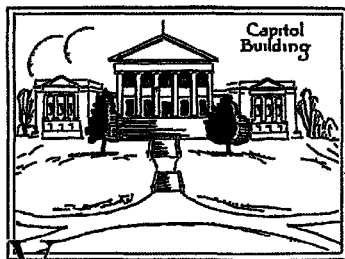
VIRGIL, *vir'jil*. See VERGIL.

VIRGIN ISLANDS OF THE UNITED STATES, a group of islands purchased by the United States from Denmark in 1917 for \$25,000,000. Before the change of ownership they were known as the DANISH WEST INDIES. Geographically the Virgin Islands are a part of the Leeward Islands, which, with the Windward Islands to the south of them, constitute the Lesser Antilles, stretching southward from Porto Rico in a great semicircle nearly to the coast of South America.

The Virgin Islands consist of three main islands—Saint Croix, Saint John and Saint Thomas—and about fifty smaller ones, only five of which are inhabited. The total population of the three larger islands is about 22,000, and the combined area is about 132 square miles. Saint Croix has an approximate area of eighty-four square miles and a population of 11,418. Saint Thomas is twenty-eight square miles in extent, and is inhabited by 9,834 persons, Saint John, with an area of twenty square miles, has 765 inhabitants. (The population statistics are from the official census report of 1930.) The great majority of the people are of negro or of mixed white and negro blood.

These islands are of volcanic and coral origin, and are of slight importance industrially, but because of their strategic value as outposts for the protection of the Panama Canal their purchase by the United States was highly approved by all Americans. The harbor of Saint Thomas, the chief town on Saint Thomas, is one of the best in the West Indies, and the town is an important

calling station for vessels plying between Europe and the Americas, especially for those bound for the Panama Canal. Vessels not only may secure coal, oil and other supplies, but find in the harbor a safe refuge from storms. The Virgin Islands carry on a small import and export trade, almost entirely with the United States. They export hides, skins, and valuable woods, and import foodstuffs, boots and shoes, principally. In 1936 Congress voted them universal suffrage and a considerable measure of home rule. See SAINT THOMAS.



VIRGINIA, *vir-jin'ee-ah*, one of the thirteen original states of the American Union, belonging to the South Atlantic group. In colonial days it was referred to in official documents as the "Dominion of Virginia," a name that survives in its popular designation, the OLD DOMINION. Virginia is the picturesque name given the colony by Sir Walter Raleigh, who bestowed it in honor of Elizabeth, the "Virgin Queen" of England. As colony and state Virginia has had a unique and honored place in American history. On its soil in 1607 was planted the first permanent English settlement in the New World. A leader in the struggle for independence, it gave the American nation its first President and seven others, besides Patrick Henry, John Marshall, Richard Henry Lee, John Randolph and other distinguished orators and statesmen. Virginia's honorary title, "Mother of Presidents," is well deserved.

Location and Area. The state is the most northerly of the South Atlantic group. It has the shape of an irregular triangle, with the apex pointing northward, and Tennessee and North Carolina lying along the base, on the south. The sloping western boundary lies adjacent to West Virginia and Kentucky;

Maryland is at the extreme north and along the northeast, Chesapeake Bay and the Atlantic Ocean bound the state on the east. With an area of 42,627 square miles, Virginia is the thirty-third commonwealth in the Union in size. Of its area, 2,365 square miles are water surface, as the state has numerous landlocked harbors and rivers. The states nearest it in size are Tennessee, with an area of 42,022 square miles, and Ohio, which covers 41,040 square miles.

People and Cities In 1920 Virginia had a population of 2,309,187. By the census of 1930 the State had a population of 2,421,851, and an average density of 60.2 persons to the square mile, and was nineteenth in rank in the United States.

About one-fourth of the people are of negro blood, the proportion of foreign-born to the total white population is about five per cent, and of the native-born population nine-tenths are Virginians by birth. Russians, Germans, English, Irish and Scotch are the most prominent of the foreign-born groups. The principal religious bodies are the Baptist, Methodist, Presbyterian, Roman Catholic and Episcopalian.

Richmond, with a reported population of 182,929 in 1930, is the capital and largest city. The cities next in size are Norfolk (129,710), Roanoke (69,206), Portsmouth (45,704), Lynchburg (40,861), Newport News (34,417), Petersburg (28,564), and Alexandria (24,149).

Surface and Drainage There are five natural divisions of Virginia, which differ greatly in scenery, soil, and productions. Named in their order, from east to west, they are the Coastal Plain (or the Tidewater), the Piedmont section, the Blue Ridge, the Appalachian Valley, and Appalachian Plateau. The Tidewater country extends about 100 miles westward from the ocean, it is divided by Chesapeake Bay and deeply cut by smaller bays, estuaries and rivers. The Piedmont section, extending from Tidewater to the Blue Ridge, is an undulating plain, increasing in elevation toward its western limits. The Blue Ridge, from three to twenty miles wide, broken by gorges and a series of beautiful peaks and expanding into an elevated plateau toward the south, is a prominent range. Its mountains and hills enclose picturesque valleys and coves.

The highest peak is Mt. Rogers (5,719 feet), in the Blue Ridge Plateau near the

Tennessee line. The Valley of Virginia, between the Blue Ridge and the "Alleghenies," is a garden spot of the state. The limestone formations in the central part of this valley contain several noted caverns, besides the famous Natural Bridge and Natural Tunnel, considered wonders of the world. The "Alleghenies" are a mountainous region of narrow ridges, inclosing troughlike valleys, and trending southwest.

The Potomac, which forms a portion of the boundary between Virginia and Maryland, drains the northern and eastern parts of the state. Its chief tributaries are the South Branch (West Virginia) and the Shenandoah. The important streams flowing into Chesapeake Bay, from north to south, are the Rappahannock, York, and the James. The Roanoke rises west of Roanoke and flows southeast into North Carolina, southwest of Emporia. This, with its tributaries, drains the south-central region. The southwestern part is drained into the Tennessee, and the northwestern, into the Potomac. The two counties, Accomac and Northampton, forming a peninsula between Chesapeake Bay and the Atlantic are lowlands, without notable streams. This area is indented by many estuaries and bays which provide safe and convenient harbors for small boats.

Climate The climate is diversified according to the natural divisions of surface. In general, the state is free from intense heat and severe cold, although sudden changes are common in most localities. The mean annual temperature is 56°. The average annual rainfall ranges from about forty to forty-five inches. The climate is healthful the year round.

Mineral Resources Virginia has a wide variety of minerals, and the annual output of all products was valued at about \$42,000,000 in 1929 and about \$17,000,000 in 1933. In the southwestern part, there are valuable coal mines now yielding 8,000,000 to 9,000,000 tons a year. Coal is the most important of the minerals, and is followed by stone products, notably cement materials, granite, limestone, sand and gravel, slate, and soapstone. Virginia is the first state in the production of soapstone. Clay products and lime are next in order of importance, among the former brick constitutes about eighty per cent of the total product.

Other minerals of commercial value include feldspar, gypsum, lead and zinc, mar-

ganese, mica, salt brine, silica, and titanium minerals. There are numerous mineral springs distributed over the state, some of which are frequented as health resorts because of their medicinal properties. Hot Springs, seventy-five miles north of Roanoke, is one of the best known.

Agriculture. Formerly cash crops furnished the major farm income, but more recently livestock, livestock products, and poultry have greatly increased in importance, and in recent years have contributed approximately one-half of the farm income.

Tobacco and potatoes alternate for the lead as the principal cash crop. Peanuts and cotton are important sources of income in about twelve counties in the southeastern part of the state. Bright tobacco is raised extensively in the central and southern sections, whereas the Burley variety is increasing in importance in the southwestern part of the state.

Virginia ranks third in the production of apples, with extensive orchards in the Shenandoah Valley and the Piedmont district. Corn is the most important crop in point of acreage and value, being largely used on the farms. Wheat is an important cash crop in the Shenandoah Valley.

Truck crops are grown extensively in Eastern Shore and Tidewater counties.

Fisheries. Virginia is one of the leading states in value of oyster fisheries, as the tidal waters contain immensely profitable beds of that mollusk, about two-thirds of the value of the entire fishery output is represented by the oyster catch. Other products of the fisheries include shad, menhaden, alewives, clams, crabs and bluefish.

Manufactures. The leading manufacturing enterprises are those connected with the making of lumber and lumber products. Second in importance is the manufacture of smoking and chewing tobacco. Richmond, which is the great center of this interest, has one of the largest tobacco factories in the United States. Flour milling, car construction and repair, leather tanning, the manufacture of fertilizer, paper making, the manufacture of cotton goods and of boots, shoes and the roasting of peanuts are other profitable lines of manufacture. Shipbuilding has developed extensively of late years, especially at Newport News, on Hampton Roads. Here is one of the largest shipyards in the country. Good water power, a wealth

of raw materials and ready means of transportation are all favorable factors in the industrial growth of the state.

Transportation. There are over 4,700 miles of railroad in operation. Some of the main lines are the Chesapeake & Ohio, the Southern, the Norfolk & Western, the Baltimore & Ohio, the Atlantic Coast Line, the Virginian Railroad, and the Seaboard Railroad. Coastwise steamers run regularly between Virginia ports and New York, Philadelphia, Baltimore and Boston, and a line of freighters plies between Newport News and Liverpool. Hampton Roads, at the mouth of the James River, is one of the finest harbors along the Atlantic coast. There is a large interstate traffic, both by rail and water. The exports consist of tobacco and its manufactured products, lumber, grain, cotton, fruit, vegetables, coal, iron and naval stores, and the imports are manufactured goods and food products. Norfolk is the chief cotton shipping port and Newport News the principal city for coal shipment.

Government. The legislature consists of a senate, which cannot exceed forty members or have less than thirty-three members, and a house of delegates of not less than ninety, nor more than 100, members. The senators are elected for four years and the delegates for two. The executive department consists of a governor, a lieutenant-governor, a secretary of the commonwealth, an auditor, a treasurer, a superintendent of public instruction, an adjutant-general and commissioners of agriculture and insurance. The state courts consist of a supreme court of appeals, of five judges, chosen by the legislature for twelve years, and circuit courts, which are held in twenty-four judicial districts, each of which has a judge, elected by the legislature for eight years. Lower courts are established for cities and towns.

Education. The public school system is under the general supervision of a State Board of Education of seven members appointed for four years by the Governor, subject to confirmation by the General Assembly, and a State Superintendent of Public Instruction appointed by the Governor, subject to confirmation of the General Assembly for a term of four years coincident with that of the Governor making the appointment. The revenue for school purposes is provided almost wholly by state and local taxation. Separate schools are maintained for the

white and colored children, and the law requires that each district must have an annual school term of at least one hundred and sixty school days

The state supports the University of Virginia, the Virginia Polytechnic Institute, the Virginia Military Institute, College of William and Mary (the second oldest college in the United States), the Medical College of Virginia, at Richmond, four state teachers colleges, one each at Farmville, Fredericksburg, Harrisonburg, and Radford, Virginia School for the Deaf and Blind at Staunton, Virginia State College for Negroes at Petersburg, Virginia State School for the Colored Deaf and Blind at Newport News The University of Virginia, at Charlottesville, was founded by Thomas Jefferson, the Virginia Military Institute, at Lexington, is called the "West Point of the South"

Other institutions of higher learning in the State consist of the following Sullins College, at Bristol, Virginia Interment College, at Bristol, Southern College, at Petersburg, Emory and Henry College, at Emory, Bridgewater College, at Bridgewater, Hampden-Sydney College, at Hampden-Sydney, Lynchburg College at Lynchburg, Randolph-Macon College, at Ashland, Randolph-Macon Woman's College, Lynchburg, Roanoke College at Salem, Sweet Briar College, at Sweet Briar, University of Richmond at Richmond, Washington and Lee University, at Lexington, Averett College, at Danville, Blackstone College, at Blackstone, Bluefield College, at Bluefield, Marion College, at Marion, Mary Baldwin College, at Staunton, and Shenandoah College, at Dayton Also Hampton Normal and Industrial School for Colored, at Hampton

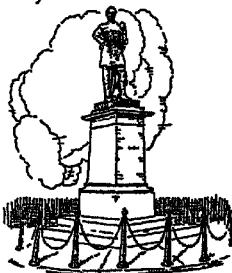
The State through its Department of Health maintains the Blue Ridge Sanatorium, at Charlottesville, the Catawba Sanatorium, near Salem, the Piedmont Sanatorium, at Burkeville Through its Department of Public Welfare it provides for the Virginia Commission for the Blind, Central State Hospital, at Petersburg, Eastern State Hospital, at Williamsburg, Southwestern State Hospital, at Marion, Western State Hospital, at Staunton, State Colony for Epileptics and Feeble-Minded, at Colony, R E Lee Camp Soldiers' Home, at Richmond, State Penitentiary Farm, at State Farm, State Penitentiary Farm for

Defective and Misdemeanant Women, at Goochland, State Penitentiary, at Richmond, Virginia Industrial School for Boys, at Maidens, Virginia Home and Industrial School for Girls, at Bon Air, Virginia Industrial School for Colored Girls, at Peaks Turnout, and Virginia Manual Labor School for Colored Boys, at Hanover.

History. The shores of Virginia were probably first visited by Sebastian Cabot in 1498, but no attempt at settlement was made until late in the following century, when Sir Walter Raleigh sent out several expeditions without success The London Company was formed in 1606, and in the following spring a colony was established at Jamestown Its leading spirit was Captain John Smith, whose energy and ability saved the settlement from early destruction by famine and Indian attacks In 1610 Lord Delaware was sent to the colony as governor, and under his wise administration the settlement prospered The year 1619 witnessed the introduction of negro slavery by Dutch traders, as well as the establishment of the first representative assembly in America From this time on many immigrants, driven from England by the persecution of the Puritans, arrived in Virginia, but at the outbreak of the Puritan revolution, in 1642, William Berkeley, a staunch royalist, became governor and promptly suppressed the rebellious spirit At this time an influx of royalists also began, which led to serious opposition to the Cromwell régime in England and to the joyful recognition of the return of the Stuarts to the throne. However, within the next few years discontent with economic conditions and the policy of the administration led to a serious insurrection, known as Bacon's Rebellion

The eighteenth century in Virginia was marked by remarkable development, especially in the westward districts of the colony During the French and Indian Wars, Virginia took an exceptionally prominent part, but it was also a leader in the resistance to Parliamentary taxation, its Assembly passing some of the earliest and most important measures of the period Virginia also furnished some of the most conspicuous figures of the time, such as Washington, Jefferson, Patrick Henry, the Lees and Madison The state took a prominent part in the Revolution, and the war ended on Virginia soil, in the surrender of Cornwallis During the early years of the Republic, the state was

VIRGINIA
THE OLD DOMINION



Items of Interest on Virginia

The present state constitution was adopted in 1802

The first white child born in the New World was born in Virginia and was named Virginia Dare.

The first exports of iron ore were sent from Virginia in 1608

Twenty thousand pounds of tobacco were exported in 1619

The first representative assembly in North America was the Virginia House of Burgesses, which met for the first time in 1619

In 1648 the population of the colony was 15,000

Seven states have been formed from territory which was formerly Virginia

During the Civil War, of the six great campaigns in the East, four were on Virginia soil, the first Manassas Campaign (1861), the Peninsular battles (1862), the second Manassas, Fredericksburg and Chancellorsville (1862-63), and the great Battles of the Wilderness and campaigns around Petersburg (1864-65)

Questions on Virginia

What is the area of Virginia?

Name and describe the physical divisions

Describe the drainage.

What is the character of the coastline?

What is the most valuable product of the fisheries?

How does Virginia rank as a tobacco-growing state?

Name four other important crops

What is the most valuable mineral product?

Name two minerals in which Virginia leads all other states

What are the leading manufactured products?

How many miles of railroad are there in the state?

What natural advantages has Richmond? What are its leading industries? What buildings of historical interest still stand in Richmond?

Name five prominent educational institutions

staunchly Anti-Federalist, but six of the first ten Presidents were Virginians

The state was at first favorable to the liberation of the slaves, but under the influence of states' rights theories and of agricultural conditions, it finally adhered to the policies of the lower South, and in the Civil War Virginia not only furnished the ablest generals in the Confederate armies, but became the battle ground of the great struggle. The state at first opposed secession, but finally passed the resolution, April 17, and from that time forward it was a continuous fighting ground between the two armies, many of the most important actions of the war, including Lee's surrender at Appomattox, taking place within its borders. A new constitution, framed in 1863, was adopted, but the state was not re-admitted until 1870. In 1902 a constitutional provision was adopted, limiting suffrage. After 1928 a gift of about \$5,000,000 from John D. Rockefeller, Jr., restored Williamsburg (settled in 1632) to its pre-Revolutionary appearance. There has been recent coordination of transportation facilities.

Related Articles Consult the following titles for additional information

CITIES

Alexandria	Petersburg
Danville	Portsmouth
Lynchburg	Richmond
Newport News	Roanoke
Norfolk	Staunton

HISTORY

Bacon's Rebellion	Jamestown
Bull Run, Battles of	Revolutionary War in America
Chancellorsville,	Smith, John
Battle of	West Virginia, sub-head History
Fredericksburg,	
Battle of	
Harper's Ferry	

RIVERS

James	Roanoke
Potomac	Shenandoah
Rappahannock	

TOPOGRAPHIC FEATURES

Alleghany Mountains	Natural Bridge
Blue Ridge	Piedmont Region
Luray Caverns	

VIRGINIA, MINN, a mining and lumbering community, eleventh city in size in the state, is in Saint Louis County, seventy-five miles northwest of Duluth, on the Great Northern, the Canadian National, and the Duluth, Missabe, & Northern railroads. It is a very important distributing point for ores from the famous Vermilion and Mesaba ranges, one of largest and richest iron-producing regions of the world. Saw mills, once famous here, are reduced to one small mill, of slight capacity. An extensive dairy industry is developing. The town was settled in 1892.

and became a city in 1905. It has been twice burned by forest fires. There are a Federal building, a public library, a county courthouse and two parks. The workmen of the mills and mines are largely of European birth. Population, 1920, 14,022; in 1930, 11,963, a loss of 14 per cent.

VIRGINIA, UNIVERSITY OF, a state institution of higher learning, located near Charlottesville, four miles from Monticello, the old home of Thomas Jefferson. The university was founded by the state of Virginia through the influence of Jefferson, in 1819, and it owes much of its efficiency to his interest and care. In October, 1903, the government board created the office of president, prior to which time the executive officer of the university was called rector. The institution is organized into academic, engineering, law, medical and agricultural departments. There are more than 150 instructors and about 2,500 students, and the library contains 200,000 volumes. The state of Virginia makes an annual appropriation for the maintenance of the university. Among the interesting buildings is the Rotunda, housing the library. The structure is modeled upon the Pantheon at Rome.

VIRGINIA CITY, Nev., once third city in the state, the county seat of Storey County, fifty-two miles southeast of Reno, on the Virginia & Truckee railroad. The city grew up about the famous Comstock lode, the world's richest silver mine, discovered in 1859, and since that time having a consolidated output amounting to approximately a billion dollars. The settlement was first known as Ophir and later as Silver City. It received its present name from James Fennimore, an early settler, familiarly known as "O'd Virginia." The city was incorporated in 1864. The population in 1880 was 10,917, the subsequent decrease being largely due to exhaustion of the lode and a decline in the price of silver. Population, 1930, 590.

VIRGINIA CREEPER, a shrubby, hardy climbing plant of the grape family. It is much grown on walls on the continent of Europe, in the British Isles and in America as an ornamental vine. The stem develops tiny rootlets along its entire length, and by means of these the vines, which often attain a great size and weight are upheld. The foliage is compound, five leaflets to a stem, and in autumn is brilliantly colored. The wild Virginia creeper is sometimes mistaken

for poison ivy, though the latter has three leaflets on a stem. Because of the little bunches of dark blue berries which appear in the fall the creeper is sometimes called *false grape*.

VIRGINIA RESOLUTIONS. See KENTUCKY AND VIRGINIA RESOLUTIONS.

VIRGO, *vir'go* (the virgin), the sixth sign of the zodiac, represented by the sign ♍. The principal star of this constellation is Spica, one of the lesser first-magnitude stars. The sun enters the constellation of Virgo about August 20th.

VIRUS. As the term is used in medicine, virus means disease poison, particularly the poison by which disease is conveyed from one person to another by contact. Formerly the application of the term was restricted to such diseases as measles, scarlet fever and smallpox, but the culture of any bacteria may be called a virus. The term is also applied to the vaccine used in vaccination.

Related Articles. Consult the following titles for additional information:

Antitoxin	Medicine
Bacteria	Vaccination
Germ Theory	Vaccine Therapy

VISCOUNT, *vi'kount*, originally, in English usage, the officer who acted as deputy to a count or earl. As a hereditary title, it was first granted to John Beaumont, in 1440. A viscount is "Right Honorable" and is styled "My Lord." His wife is a *viscountess*, and his children are addressed as "Honorable."

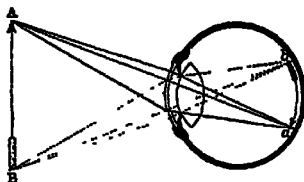
VISHNU, the second of the three great Hindu gods, by his special worshippers considered to be the greatest. In the early Vedas he was not regarded as the most exalted deity, but this rank was accorded to him by the later writers. The myths relating to Vishnu are characterized by the idea that whenever a great physical or moral disorder affected the world, Vishnu descended to set it right. He is generally represented as having four hands, in which he holds a conch-shell, blown in battle, a disk, the symbol of supreme power, a mace, the emblem of punishment, and a lotus, the sign of the creative power. Often he is shown as riding on a *bang*, half man and half bird. See BRAHMA, SIVA.

VISIBLE SPEECH, a term applied by Prof. A. Melville Bell, its inventor, to a system of alphabetical characters, designed to represent every possible articulate utterance of the organs of speech. The system is based

or an exhaustive classification of the possible actions of the speech organs, each organ and every mode of action having its appropriate symbol. It is said that this invention is of great utility in teaching the deaf and dumb to comprehend spoken words and in aiding students of foreign languages to acquire their pronunciation from books.

VISIGOTHS, *vis'e goths*. See **GOTHS**.

VISION, *vis'h'un*, or **SIGHT**, the act of perceiving objects through the eye. As an optical instrument, the eye closely resembles a camera, the cornea and crystalline lens



corresponding to the lens of a camera, and the retina corresponding to the screen. The rods and cones of the retina are sensitive only to the light, and their great number and variety enables the perfect eye to respond to light waves producing all colors. Rays of light entering the eye through the pupil are refracted, and they cross just back of the lens, the rays from *A* coming to a focus on the retina at *a*, and those at *B* coming to a focus at *b*, thus forming an inverted image on the retina. This may be observed by carefully cutting away the sclerotic coat from around the optic nerve of an eye taken from one of the lower animals, exposing the retina over an area about the size of a dime, and holding the eye towards a lighted lamp in a darkened room. An image of the lamp inverted on the retina can be plainly seen.

Physiology of Vision. Though the image may fall on the retina of a dead eye, there can be no vision in such case, as vision must depend upon the action of the living optic nerve.

The sensory fibers of the optic nerve originate in the optic centers of the brain. These fibers meet and cross at the base of the brain, forming the *optic commissure*, from which the optic nerves extend to each eye. In the commissure, half of the fibers cross, so that each optic nerve consists of half of the fibers from its own optic center and half of the fibers from the optic center on the opposite side of the brain. On reaching the eye, these

fibers are so distributed that those from the right optic center form the right half of the retina in each eye, and those from the left center form the left half. When the rods and cones are stimulated, impulses are transmitted along the optic nerves and optic tracks to the centers of unconscious sight in the brain. From these centers, other nerves extend to the centers of vision, and when the stimuli are strong enough to cause impulses to be transmitted to these centers, the person becomes conscious of them and sees the object. This is completed vision, and the image is retained in memory for a greater or less length of time, depending upon the strength of the stimuli and mental condition at the time the vision occurs. Consciousness and memory are mental activities, so that complete, intelligent vision depends upon mental, as well as physical action.

Related Articles. Consult the following titles for additional information:

Camera	Eye	Light
Color	Lens	Memory

VITAMINS, *vita'mins*, a term applied to certain substances found in minute quantities in natural foodstuffs. Little is known concerning their constitution or how they act to promote growth and prevent disease. They have no direct food value in themselves; they do not in themselves supply energy to build tissue. Yet they are absolutely essential for growth and health. At least seven kinds of vitamins are known and a proper distribution of these in food is essential to a nourishing diet.

The vitamins are classified as follows:

A Promotes growth, prevents disease in general. Present in milk, butter, eggs, and green-leaf vegetables.

B Divided into **F** and **G**. Present in fresh vegetables, yeast and cereals.

C Prevents scurvy. Present in juices of the tomato, the orange, and the lemon.

D Prevents rickets. Present in cod liver oil and in some green vegetables.

E Necessary for reproduction and growth of young animals. Present in wheat germs and lettuce.

F Lack of this leads to loss of appetite, nervousness, spasms, etc.

G Prevents the disease known as pellagra.

VITAL STATISTICS. See **POPULATION**, subhead *Vital Statistics*.

VITRIOL, *oil*, or, the common name given to strong sulphuric acid. See **SULPHURIC ACID**.

VIVISECTION, *vis'isek'shun*, physiological investigation on living animals for the

purpose of discovering or demonstrating some fact of physiology. The term, which literally means *the cutting of the living*, was formerly employed to designate only cutting operations upon living animals for purposes of experiment. To-day it has a broader application and includes the inoculating with disease germs, experimenting with drugs, medicines, foods, with the effects of temperature upon living organisms, as well as cutting operations involving nerves, arteries and vital organs.

Vivisection has been generally regarded as the necessary means of acquiring physiological knowledge. Practically our entire knowledge of bacteriology and of the effects of drugs and medicines has been gained through this method of investigation, and nearly every operation and appliance to relieve pain or save life has been made possible through it. The facts concerning the circulation of the blood, respiration, digestion and the functions of the nervous system have been discovered by means of vivisection. The experiments are usually conducted in the most humane manner possible. The animals are placed whenever possible under the influence of anaesthetics and suffer little or no pain. If an experiment necessitates the mutilation of the subject, the animal is put to death while it is still insensible.

VIZIER, *vis'yer*, a high official in Mohammedan countries, particularly the prime minister to the sultan, known as the grand vizier and possessing powers second only to the ruler himself.

VLADIVOSTOK, *vlah dye vohs tohk'*, SIBERIA, the chief commercial and naval port of the country on the Pacific, the eastern terminus of the Trans-Siberian Railway. The city lies at the southern end of a peninsula, on an arm of the Sea of Japan. It has a fine harbor, ice-free nine months of the year, and is connected by steamship lines with Japanese, Korean, North Siberian and North American ports. The city is impressive in appearance when viewed from the magnificent bay, but on closer inspection is disappointing. During the World War great quantities of war supplies were deposited at Vladivostok, and after the Bolsheviks overthrew the government in Russia the allies landed troops in the city to guard the supplies and maintain order. Vice was rampant in the troubled days of the war. Population, 1933, 190,000. See SIBERIA.

VOCATIONAL EDUCATION, that type of education designed to prepare young people for their life work. As the term is ordinarily used, it applies to education below college grade, but in its broadest sense it should include preparation for professions as well as occupations. Since the beginning of the present century, vocational education has made rapid progress everywhere in Europe and America.

When the United States entered the World War in 1917, the government at once discovered the dearth of skilled workmen in all the trades in which increased activity became at once a vital necessity. Especially was there a scarcity of mechanics, carpenters and shipbuilders, and to supply the demand, the government entered upon a campaign of industrial training on a scale never before undertaken. This campaign was conducted by the committee on Education and Special Training of the War Department. Colleges, technical schools and high schools followed the lead of this committee, and the progress in vocational education in the two years following the declaration of war exceeded that during the ten years preceding that date.

The labor conditions confronting the government led to a thorough study, on the part of educators, of the relation of the schools to this condition. Some of the most far-reaching causes of the lack of skilled workmen were found to be, first, dropping the old apprentice system without providing anything to take its place, and the rise of the factory system, involving the extensive use of machines which do not require skilled operatives; second, lack of education. Only one-fourth of the pupils who enter the primary grades of the public schools complete the work of the eighth grade, and nearly one-half of them leave school before they reach the seventh grade. Most of these boys and girls go to work with practically no foundation for mental development, and only a few of them become skilled workmen in any occupation requiring a trained mind.

A majority of these pupils leave school because they find no interest in the subjects presented in the course of study and because their parents are unable to realize the importance to their children's success, of at least, an elementary education, whatever occupation they may follow. If the course of study could be so changed as to relate it more vitally to the occupations of life, it is agreed that

most of these pupils could be retained in school. Under the leadership of the United States Bureau of Education the leading educators made such revisions of the courses of study as enabled them to provide more liberally for vocational subjects and vocational guidance.

Vocational Guidance Vocational guidance is the first step in vocational education. For lack of it at the proper time, many boys and girls become misfits for life. By vocational guidance is meant that friendly interest in and oversight of boys and girls that will keep them in school, hold up to them ideals worth following, and lead them to have a definite purpose in life. This oversight should be given by both parents and teachers, and should always be kindly and sympathetic. Its ultimate aim should be to lead boys and girls to choose their life work deliberately, and to make such choices as will harmonize with their respective desires and aptitudes and lead to a successful career. Proper vocational guidance does not force boys and girls to choose occupations before they are old enough to know what they want to do. On the contrary, it strives to prevent them from making choices hastily.

Vocational guidance is especially helpful to boys and girls between twelve and sixteen years of age. It should help them "to a better understanding of their own abilities, of the opportunities afforded to do the world's work and of the best possible use to be made of such abilities and opportunities." Between fourteen and sixteen years of age, both boys and girls leave school in large numbers. A wise vocational counselor may influence many of them to remain in school for one or two years more. But he should follow with equal care those who go into the various lines of industry. These young people should be encouraged to continue their education while at work, and all possible assistance should be given them.

The competent vocational counselor also keeps in touch with the employer. While noting the industry and the efficiency of these young people, he likewise notices the conditions under which they work, and whether or not the occupation in which each is engaged is suited to the worker's strength and aptitude. When one is found working amidst undesirable surroundings or at an occupation for which he is in no wise fitted, a change is recommended. On the other hand, boys and

girls should be encouraged to give the occupations they have respectively entered upon a fair trial, to put their best efforts into their work and to learn all they can about the business or trade in which they are engaged.

Pre-Vocational Education Pre-vocational training is designed to assist young people who have not chosen a vocation in making such a choice. In large cities where there are schools equipped for carrying on various lines of industry the pupils are given opportunity to try out different vocations. But in addition to this, instruction is given upon the advantages, possibilities and disadvantages of each occupation, so each pupil may have a fair understanding of the relative position in the world's industry which the vocation he chooses holds. The bearing of the different branches in the course of study upon the various occupations should also be explained, and courses of reading should be suggested. The Junior High School is an important aid in this phase of the vocational education (see HIGH SCHOOL, subhead *Junior High School*).

Vocational Schools About eighty-five per cent of the pupils trained in the public schools earn their living through industrial processes, and vocational schools are designed to fit young people for useful occupations. They differ from the old style manual training school in training their pupils specifically to enter upon some occupation, while the instruction in the manual training school is more for the purpose of training the hand for the cultural value derived from such training.

Vocational schools are elementary in character, but they do not receive pupils under fourteen years of age. The courses are usually two years in length, a few schools have three-year courses. In most of the schools the time is about equally divided between book-work and shop-work. The school work includes English, mechanical drawing, mathematics and other closely-related subjects. The shop-work is taught by practical men. Many evening schools are largely vocational.

Continuation Schools There is an increasing demand for better educated workmen in all lines of industry. Many boys and girls and men and women have entered upon their chosen vocations with less than a com-

mon school education, and the purpose of continuation schools is to enable these people to continue their school work while following their occupations. Students in these schools may pursue lines of work that will perfect them in some special industry, or they may continue their general education. Evening schools may be considered a branch of continuation schools. The most successful schools of this type are those where arrangements are made with the employer by which the student is allowed to spend a part of the day at work and the remainder at school. In some schools the students are allowed credit for this outside work. Schools operating on this plan are sometimes called *cooperative* schools.

Technical High Schools. Technical high schools have become a feature in the school systems of most large cities. Such schools aim to prepare trained workers for leadership in the industrial world, for positions of higher rank than those of skilled mechanics. Cleveland and Chicago took the lead in introducing industrial courses in high school work, and these and other cities have such special schools.

The textile industry in the United States supports a number of schools which are closely allied to the high schools. Prominent among these are the Textile School of the Pennsylvania Museum at Philadelphia, and three schools in Massachusetts, at Fall River, New Bedford and Lowell, all three cities being great cloth manufacturing centers. These schools, which are partly supported by the state, turn out mature students able to fill important positions in the textile mills. Secondary schools, such as the Lewis Institute at Chicago, the Drexel Institute at Philadelphia, and the Pratt Institute at Brooklyn, now offer similar courses of training.

Trade Schools. Trade schools have been developed to take the place of the apprenticeship system. The first important one in the United States, the New York Trade School, was founded in 1881, and was intended primarily for the mechanics in the building trades. A number of other important schools were established in the next thirty years, but not until 1910 was there a notable increase in the number of trade schools. Many of the schools, like the Baron de Hirsch School in New York, are privately endowed. In Chicago, Milwaukee, Philadelphia, Indianapolis, Worcester and Portland, Oregon,

are trade schools supported wholly or in part by the municipality.

United States Aid. The most important factor in promoting vocational education in the United States is the Smith-Hughes Act, which became effective in February, 1917. This law is explained under **HIGH SCHOOL** (which see). The passage of this bill, for which the National Society for the Promotion of Industrial Education had labored for ten years, marked the beginning of a new educational policy, in granting Federal aid to schools below collegiate grade which are not state institutions. This act supplements the Morrill Act, which provided for the state agricultural colleges and experiment stations, and it makes provision for the training of a large group of the population that cannot be reached directly by the Federal government. The provision of the act requiring the state governments to cooperate with the Federal government in order to derive any benefit from the appropriation places vocational education on a permanent basis in every state.

Aid to Soldiers. In June, 1918, Congress passed a law providing for the vocational education of disabled soldiers and sailors on their return to civil life. The responsibility for this training is placed with the Federal Board of Vocational Education, and the plan provides for the cooperation of the War and Navy departments, the Bureau of War Risk Insurance and the labor exchanges in the Department of Labor. The scope of the work includes completion of the training for such occupation as the soldier may choose and placing him in industry.

Another important phase of vocational education among the soldiers is the Students' Army Training Corps. The aim of this corps is "to train officer-candidates and technical experts of all kinds to meet the needs of the service." Soon after the organization of this work it was placed in operation in over 550 colleges, universities, professional, technical and trade schools of the country. The corps was divided into two sections—collegiate, or section A, and vocational, or section B. The work in section B dealt largely with the difficulty confronting the government at the beginning of the war, and stated in the opening paragraph of this article. In order to accomplish the work necessary within a given time, the soldiers were assigned to the various schools and colleges of the coun-

try, where they remained under military discipline and were given industrial instruction, including shop practices for periods of two months each, one unit following another until the training was completed

Effect Upon the Educational System. The work of the section B units of the Students' Army Training Corps is considered to have been the most significant experiment in vocational education undertaken under a democratic form of government, and the influence upon the American educational system has been far-reaching. The results derived from these short courses have demonstrated beyond doubt the futility of short and incomplete courses and shop periods. It is necessary for the student to devote enough time to vocational training to work out the processes completely. This experiment also demonstrated the necessity of a more general development of the continuation school and upon a much larger scale than has yet been contemplated

Another fact learned from the recent study of vocational education is that laws relating to general education, laws relating to vocational education and laws relating to child labor are not coordinated. Until such coordination is made in both state and national laws, the most efficient work in education cannot be done.

VODKA, an alcoholic liquor distilled from corn, rye, or potatoes, or from barley mixed with potatoes and oats, or from potatoes and molasses. It is "hard liquor" of a most potent sort, for its natural alcoholic content varies from 60 to 90 per cent, before it is retailed the amount of alcohol is reduced by dilution to about 40 per cent. Vodka is strictly a Russian drink, and is the national beverage. During the World War the czar prohibited its manufacture, in 1925 the Soviet government restored its sale as a state monopoly, and from it derives a very large revenue.

VOICE, *vois*, sound emitted by the vocal cords of persons and animals, by means of which they communicate to one another their thoughts or emotions. The organ of the voice is the larynx, a cartilaginous box at the top of the trachea, or windpipe, capable of more delicate adjustment than any musical instrument. Across its top are stretched highly-sensitive and delicate mucous membranes, the edges of which are specialized to form the vocal cords. Sound is produced by

a blast of air forced from the lungs upward through the glottis, or opening between the cords.

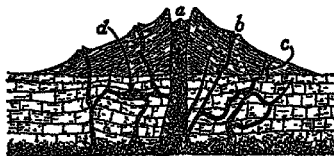
The pitch of the voice depends upon the tension of the vocal cords, the greater the tension, the higher the note produced. During the emission of acute sounds, the glottis contracts to a mere line. A deep rumbling sound is made by relaxed cords. The strength or loudness of the voice depends on the energy of the expiratory blast. Its quality depends upon the form and thickness of the cords, and is modified by the varying position of tongue, teeth and lips.

In the speaking voice, the notes have nearly all the same pitch, variety being mainly achieved through articulation in the mouth. The musical voice makes use of a larger number of notes, and their vibrations correspond to the notes of the musical scale. In singing, the vocal cords are under greater tension than in speaking. The principal difference between male and female voices lies in their pitch. The female vocal cords are shorter than those of the male, therefore their pitch is correspondingly higher. The male singing voice is classed as tenor, or bass, according to quality, and the female as soprano or contralto. The combined range of both covers about four octaves. A boy's voice is alto or soprano, because the vocal cords are no longer than those of the female. Change of voice in the adolescent boy, when the voice cracks or breaks, is due to rapid change in the larynx and temporary imperfect muscular control. See **LARYNX**.

VO' LAPUK, an artificial language invented by Johann Martin Schleyer, a German priest, and published by him in 1879. It was intended for use as an international language, but the hope of its friends has never been realized. Volapuk is extremely simple and regular in construction, and the orthography is entirely phonetic, the words being pronounced as they are written. The root words are derived from all the languages of Europe. Volapuk at first attracted many students, and international congresses were held in 1884, 1887 and 1889. Disagreements among its adherents regarding reforms in the language retarded the movement and ultimately led to the development of new and rival systems. See **ESPERANTO**.

VOLOCANO, *vol ka'no*, a mountain that has one or more openings through which heated matter is thrown from the interior. The

parts of a volcano are shown in the illustration below. The base comprises the walls and often blends with the cone so completely that no line of separation can be discovered. The term *cone* is usually applied to the upper



VOLCANO

(a) Crater, (b) Extinct crater, (c) Crevices, (d) Steam cavity

and more recently formed portion of the volcano. In its summit is the opening called the crater. Leading from the crater down into the interior of the mountain is the *vent*, or *chimney*.

The form of the volcano depends quite largely upon the material thrown out. If this is ashes or thick viscid lava, that does not flow rapidly, the slopes of the mountain are steep and may be quite regular, as in the case of Vesuvius, Etna and many of the volcanoes of the Andes. If the material is of molten lava, that flows freely, a low, flat mountain, with gentle slopes, is formed. The volcanoes of Hawaii are the best illustrations of this type. In these volcanoes the flow of lava seldom takes place through an opening at the summit, but an outlet is forced through one or more crevices in the sides of the mountain. The crater is large and shallow and contains numerous vents, surrounded by small cones. Between these may also be found pools of molten lava.

In size, volcanoes vary from low mountains, comparatively small, like those in the vicinity of the Mediterranean, to great peaks, whose summits are from 17,000 to 20,000 feet above the sea, as is seen in the volcanoes of the Andes and the highest peaks of the Rocky Mountains, which are extinct volcanoes.

Volcanoes are classified as active, dormant and extinct. *Active* volcanoes are those either in continuous or frequent action. *Dormant* volcanoes are those which are active only at long intervals, and *extinct* volcanoes are those which have ceased action altogether. There is, however, no absolute division, as a volcano may pass from one class into another without warning, that is, a dormant or extinct volcano

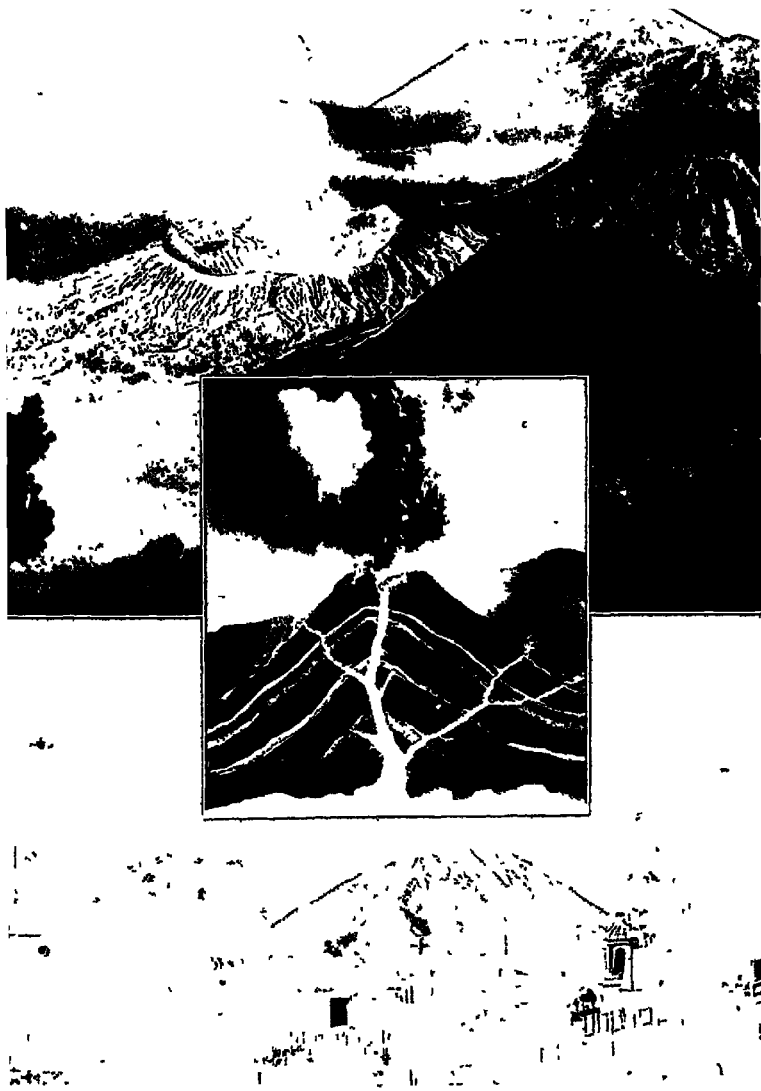
may become active, and an active volcano may become extinct.

Eruptions. The nature of the eruption is determined by the character of the material thrown out, and its violence is usually proportional to the length of time the mountain has been quiet. Volcanoes accustomed to throw out molten lava seldom eject ashes in large quantities. At the beginning, the lava flows rapidly, but as it cools it crusts over and flows more and more slowly until its motion ceases. The flow destroys everything in the path of the fiery stream, and the eruption often causes great devastation, suffering and loss of life. Some eruptions are characterized only by solid matter and steam. The solid matter is in the form of masses of rock, gravel, sand and dust, or ashes. These rise to a great height and are often carried through the atmosphere for many miles.

The causes of volcanic action are not well understood; but the chief cause is generally believed to be the contact of water with highly heated portions of the earth's interior. The violence of the action is supposed to be due to the expansive force of steam that has suddenly been released from great pressure. The steam forces out the ashes. The flow of lava is probably caused by its being squeezed into the fissure by the movements of the earth's crust. Some geologists believe that there are lakes of molten rock in various places in the interior of the earth, and that these are subject to tides like those on the ocean. They reason that the increased pressure caused by these tides may now and then force an opening in the earth's crust through which the heated matter is thrown out. An eruption is usually preceded by an increase in temperature of the land at the base and on the sides of the mountain, the drying up of springs and wells and frequently by local earthquakes. The most disastrous eruptions, as affecting loss of life, were the eruption of Vesuvius, A. D. 79, Krakatoa, in 1883, and Mount Pelee, on the island of Martinique, in 1902. At this eruption over thirty thousand people lost their lives within a few hours. The eruption of Mount Etna in 1911 was also very disastrous.

Related Articles Consult the following titles for additional information

Acencagua	Herquianum	Mauna Loa
Ararat	Hood, Mount	Mountain
Cotopaxi	Killmanjaro	Pompeii
Earthquake	Lava	Popocatepetl
Etna	Martinique	Rainier, Mount
Fujiyama	Mauna Kea	Vesuvius



VOLCANOES

Three of Java's many volcanoes Cross section shows how subterranean forces effect an outlet in the earth's crust to release molten rock, ashes and gas El Misti, a slumbering giant of Peru

1 3 Ewing Calloway 2 Publishers Photo Service



THREE FAMOUS VOLCANOES

Mount Vesuvius from across the Bay of Naples, Mount Lassen, California, last active in 1915, Fujiyama, Japan's sacred mountain

Ewing Galloway

VOLE, an English name applied to several species of the rat family. The voles are widely distributed, being found in Europe,



FIELD VOLE

Africa, Asia and in North and South America. The *water vole* is about the same size as the brown rat, and it is often called a rat. It has dark brown or black fur, a tail about half the length of the body, and very strong hind feet, with five rounded pads on the lower surfaces. It burrows by the banks of streams and feeds for the most part on vegetable food. The *field vole*, or *short-tailed field mouse*, is about the size of a common mouse, but the body is stouter and the tail shorter. It has brownish-gray fur, its hind feet have six pads. It lives in fields and woods, feeds on vegetable food, is very prolific and often does much damage to grain and other crops. The *bank vole* is like the field vole, but it has a rusty-colored back, larger ears and a longer tail.

VOLGA, a river of Russia, the largest in Europe. It rises near the Valdai Hills, in the northwestern part of Russia, and flows in a circuitous course eastward and then southward, entering the Caspian Sea through a broad delta, a few miles below Astrakhan. The length of the river is about 2,200 miles, and it is navigable for nearly its entire course. The chief tributaries from the north and east are the Oka, the Sura and the Sarpa, and from the west, the Tvertsa, the Mologa, the Sheksna, the Kostroma, the Vetluga, the Kama and the Samara. The width of the river varies from 420 feet to 700 feet and exceeds even 2,400 feet, at Nijni Novgorod. During the spring it sometimes overflows, when its width varies from one and one-fourth miles to three miles. By means of canals the Volga is connected with the Black, the Baltic and the White seas, and with other important navigable rivers, so that it constitutes one of the most important inland waterways of Europe. With its tributaries it traverses a region inhabited by 50,000,000 people.

VOLT, the unit employed in measuring electric pressure, such a pressure as will produce a flow of one ampere per second against a resistance of one ohm.

VOLTA, *voh' ta*, **ALESSANDRO** (1745-1827), an Italian scientist, famous for his researches and discoveries in physics and as the inventor of the voltaic battery, named after him. He was born at Como, Italy, where, in 1774, he became professor of physics in the Royal School. He previously made important investigations and discoveries in chemistry and physics, especially in electricity. In 1779 he became professor of physics in the University of Pavia, and remained there twenty-five years. He invented the electroscope, the electrical condenser, the voltaic pile and the voltaic cell, or battery. See **ELECTRIC BATTERY**.

VOLTAIC CELL, or **VOLTAIC BATTERY**. See **ELECTRIC BATTERY**, **ELECTRICITY**, subhead *Voltaic Electricity*.

VOLTAIRE, *vol' tar'*, the assumed name of **JEAN FRANÇOIS MARIE AROUET** (1694-1778), a French writer and philosopher, was born at Paris. His father, a notary, gave him the best education possible, and the young man was early recognized as a scholar. In 1718 a tragedy named *Oedipus* was brought out by him and was most enthusiastically received. He soon became a fashionable poet, and resided mainly at Paris, in the midst of the most brilliant society.

In 1726 he was imprisoned in the Bastille for having sent a challenge to the Chevalier Rohan, by whom he had been insulted, but he was liberated within a month and allowed to go to England. Here he resided till 1729, in friendship with some of the chief literary men of the day, and he acquired a knowledge of English literature. His *Henriade*, an epic celebrating the exploits of Henry IV of France, was completed and published by subscription in England, and was widely read throughout Europe, except in France, from which country it was excluded by the government because of its forceful presentation of the idea of religious toleration.

After his return to France, Voltaire lived chiefly at Paris till 1734. During this period he raised himself from very moderate circumstances to a condition of affluence by successful monetary speculations. From 1734 to 1749 he resided with Madame du Châtelet at Cirey, in Lorraine, and he produced many plays during this period. After

the death of Madame du Châtelet, Voltaire accepted the oft-repeated invitations of Frederick the Great to live at his court, at Potsdam. Here he was received with great honor, but a series of disagreements with the king ended in Voltaire's retirement from the Prussian court in 1753. After some unsettled years he fixed his residence with his niece, Madame Denis, at Ferney, near the boundary of the Republic of Geneva, and here he received a constant succession of distinguished visitors and maintained a correspondence which included in its range most of the rulers and savants of Europe. In February, 1778, he returned to Paris, but died soon afterwards.

Voltaire's works embrace almost every branch of literature—poetry, the drama, romance, history, philosophy and even science. He produced no single literary masterpiece, his greatness lay in his power to discern fanaticism and superstition, and nearly all his works are strongly animated by a spirit of hostility to the priests and the religion they represented. He was one of the foremost of that band of writers whose revolt against conventions, openly and most forcefully expressed, was preparing the way for the French Revolution. It is the commonly accepted opinion that he was an atheist, but this has never been proved. Voltaire's literary fame chiefly rests on his philosophical novels, *Zadig*, *Candide*, *L'Ingénu*; his histories, *The Age of Louis XIV*, *The History of Charles XII*, his correspondence, and more than all, perhaps, on his poetical epistles, satires and occasional light poems, all of which exhibit wit, gaiety, vivacity and grace.

VOLTMETER, an instrument for measuring the pressure of an electric current. It consists of a permanent steel horseshoe magnet, with a piece of soft iron attached to each pole. Between the poles, a soft iron cylinder is suspended, so that it can rotate vertically. Around this cylinder is a light rectangular frame of copper, wound with a coil of insulated wire. Spiral springs are attached at each end of this frame, and a needle, which moves over a graduated dial, is attached to the upper end of the axis. When an electric current passes through the coil or wire, it causes the copper frame to turn upon its axis. The springs furnish an amount of resistance that must be overcome by the current, and the position of the needle on the dial indicates the pressure. Volt-

meters are used with dynamo electric machines. See **VOLT**.

VOLUNTEERS', citizens who, of their own accord, offer the state their services in a military capacity. The oldest volunteer force in Great Britain is the Honorable Artillery Company of the city of London, which received its charter of incorporation from Henry VIII. Until the second year of the World War Great Britain depended upon a volunteer army to take care of territorial defense, and its volunteer forces in 1914 numbered over 251,000. Not until May, 1916, was conscription put in force in Great Britain. It was applied to England, Scotland and Wales, but not to Ireland, which, however, sent large numbers of volunteers to the front. Canada contributed a volunteer army of over 400,000, but adopted conscription in December, 1917. New Zealand, South Africa and Australia relied wholly on volunteering, and all contributed generously. In all of the other allied nations, as well as in the enemy countries, conscription had been a permanent policy before the war.

In the United States. The volunteers in American armies played an important part in all wars before America's entrance into the World War. Though conscription was resorted to in the Civil War, about 2,500,000 enrolled voluntarily on the Union side, and half as many on the Confederate. Volunteers and regulars made up the American army of the Spanish-American War. In the World War there were calls for volunteers in special branches of the service, and the state national guards were classed as volunteers, but the bulk of the great army that contributed so much to the defeat of Germany was made up of men enrolled through the selective draft. This was the first time that America ever enrolled all of its men under forty-six years of age for military service. Navies are usually recruited through volunteering, but this is a matter of custom and precedent. See **CONSCRIPTION**; **WORLD WAR**.

VOLUNTEERS OF AMERICA, a religious and philanthropic organization, formerly the American branch of the Salvation Army. In 1896 Ballington Booth, head of the Salvation Army in America, believing that the methods of his father, William Booth, were not perfectly suited to conditions in America, severed the connection of his branch which, thenceforth, has had an independent

existence. The main purpose of the English and the American bodies, however, has remained the same.

The Volunteers are organized on a semi-military plan, and the officers bear military titles. They support various benevolent institutions. Lodging houses for destitute men and women and fresh-air camps for women and children are among their most important charities. A great quantity of Christian literature is distributed, and open-air religious services are conducted on the streets. A Volunteer Hospital has been established in New York City, where needy cases are taken care of. The official organ of the society is *The Volunteers' Gazette*, published at its headquarters in New York. General Ballington Booth and his wife, Maud Ballington Booth, are joint commanders. See SALVATION ARMY.

VOMITING, the forcible expulsion of matter from the stomach, through the oesophagus, or gullet. It is not a disease in itself, but it is a symptom common to numerous diseases, or as an accompaniment of extreme nervous sensitiveness. The treatment of vomiting depends upon its cause and upon the disease, if any, which accompanies it. Lying down, the application of mustard to the pit of the stomach, or small doses of soda, ice, whisky or coffee will sometimes relieve it. While sudden and violent vomiting in a healthy person is an indication of some poisonous substance in the stomach, yet very frequently vomiting is nature's method of relieving an overloaded stomach. See NAUSEA.

VORTICELLA, *vor ts sel'lah*, or **BELL ANIMALCULE**, *an : mal'iu le*, a genus of infusoria, or one-celled animals characterized by a bell-shaped body, the opening of which is surrounded by tiny hairs, or cilia. These cilia are kept in constant and rapid motion, whereby they draw in particles of food. At the opposite end of the body is a slender stem, by means of which the animal attaches itself to objects in the water, such as rocks or weeds. This stem also moves, with a spiral springlike motion, and may be drawn up into the body when the animal wishes to detach itself from its moorings and swim freely about.

VOSGES, *vohsh*, **MOUNTAINS**, a chain of mountains about 100 miles long, extending in a north-northeast direction along the frontiers of Alsace in France, their course being nearly parallel with that of the Rhine. They

are separated from the Jura Mountains by the valley of the Doubs on the south. The Vosges are composed chiefly of granite and are covered with forests of pine and beech to a height of about 3,600 feet, beyond which their summits, which are rounded in forms, are grassy. The highest peak is Ballon de Guebwiller, 4,067 feet. These mountains contain considerable silver, copper, lead and coal and large quantities of rock salt. Some of the bitter fighting of the World War took place in the Vosges region.

VOTE See ELECTION, BALLOT.

VOTING MACHINE, a device for automatically registering and counting votes, having the advantages of secrecy, simplicity, rapidity of registration and counting and the avoidance of duplication.

In most patterns of voting machines, the voter enters the booth, and not till all the curtains are closed will the machine register his vote. The names of the candidates are arranged in order, either by parties or alphabetically. The voter can either vote a straight ticket or can vote for individual candidates. In the former case, either by the use of a key or by means of a lever, he registers a vote and thus locks the mechanism, so that he cannot vote further, unless, by turning back the lever, he cancels his first vote. If he wishes to split the ticket, he turns a lever or key for one candidate for each office, and is prevented thereby from voting for any other candidate. As he leaves the booth, by opening the curtains or doors at the exit he sets the machine for the next voter. Each vote cast for each office or for a straight ticket is registered by a patent device on a slip of paper, so that as soon as the last vote is cast, the final returns are ready to be announced. Many states have authorized the use of voting machines at the option of the local authorities.

VOWEL, an open sound made by the voice in speaking, distinguished from the consonant sounds, which are made with the organs of speech more or less closed. Vowels may be sounded by themselves, but consonants can be pronounced only in combination with vowels. In English, the vowel sounds are represented by the letters, *a, e, i, o, u*, and sometimes *w* and *y*. Each really represents several sounds, as the *a*-sounds in the words *father*, *ask*, *hall*, *what*, *any*, *preface*, *final* and *abound*. Most other languages have vowel sounds which the English does

not possess A more detailed discussion of vowels may be found in the article ORTHOGRAPHY

VULCAN, called by the Greeks Hephaestus, in classical mythology, the god who presided over fire and the working of metals, and who patronized handicraftsmen of every kind He was the son of Jupiter and Juno, but, unlike the other gods, he was seriously lame By some writers he was said to have been born lame, and for that reason he was believed to have been thrown by his mother from Olympus, but by others his lameness is attributed to his having been thrown from Olympus by Jupiter, for interfering in Juno's behalf in a quarrel between her and Jupiter.

VULCANIZING. See RUBBER AND RUBBER MANUFACTURE

VULGATE, the Latin translation of the Bible, which has, in the Roman Catholic Church, official authority, and which the Council of Trent, in its fourth session, on May 27, 1546, declared "shall be held as authentic in all public lectures, disputations, sermons and expositions, and that no one shall presume to reject it under any pretense whatsoever" Even in the early period of the Church, a Latin translation of the Old Testament existed, made not from the Hebrew, but from the Septuagint Saint Jerome found that this translation was not always accurate, and between A D 385 and 405 he made a new Latin translation from the Hebrew, with the aid of the best Greek translations. This at first met with the greatest opposition, as the Septuagint was regarded as an inspired translation, and any deviation from it was considered sacrilegious Before his death Jerome had justified himself and proved the purity of his intentions, but it was not until the ninth century that his version came to be used throughout the Church and not until centuries later that it was authorized The version now in use is the edition published by Clement VIII in 1592.

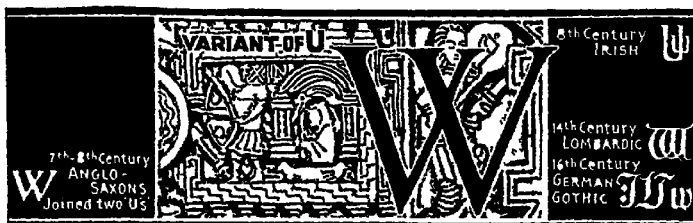
VULTURE, the common name for a class of carrion-eating birds, characterized by necks destitute of feathers and by elongated beaks, with curved upper mandibles Their talons are not relatively strong, and in tear-



VULTURES

1, Griffon, 2, Pondicherry

ing their prey they make more use of their beaks than of their claws Vultures are usually of a cowardly disposition and will not attack live animals, unless the latter are seriously wounded or dying, as they feed almost entirely on decaying animal flesh They fly high in the air and detect their prey from great distances They are valuable scavengers in all warm and tropical countries. The California vulture has a long, flat, orange-colored head and dull black plumage, with a grayish wing band. It builds a loose nest of sticks, in a hollow in a tree or cliff, and lays one round, greenish-white egg The Egyptian species, called "Pharaoh's hen," is found in the countries bordering the Mediterranean. See CONDOR, TURKEY BUZZARD



W, the twenty-third letter of the English alphabet. It is formed, as its name indicates, by doubling the *u* or *v*, and before it appeared as a separate character in English its sound was sometimes represented by *uu* or *vv*. At the end of words or syllables it is either silent, as in *low*, or it modifies the preceding vowel, as in *new*, *how*, having then the power of a vowel.

WABASH, *waw'bash*, **IND**, the county seat of Wabash County, forty-two miles southwest of Fort Wayne, on the Wabash River and on the Big Four and the Wabash railroads. It is surrounded by a rich agricultural and stock-raising region. Its industries include railroad shops, bridge and iron works, cabinet and motor truck factories and woolen and lumber mills. The city is built in rock and is hilly even in the business section. It has a Federal building, Carnegie Library, Masonic Temple and Memorial Hall. Wabash was settled and incorporated in 1837, and was chartered as a city in 1866. Population, 1920, 8,872, in 1930, 8,840, a loss of 10 per cent.

WABASH RIVER, a river 550 miles in length, rising in the western part of Ohio, flowing northwestward, westward then southward into the Ohio thirty miles below Evansville, Ind. It crosses Indiana, and in the latter part of its course forms a part of the boundary between Indiana and Illinois. It is navigable during high water as far as Lafayette, Ind., and at ordinary levels to Covington. Its chief tributary is the White River. Some of the principal towns on its banks are Wabash, Peru, Logansport, Lafayette, Covington, Terre Haute and Vincennes.

WACHT AM RHEIN, *Die* ("the Watch on the Rhine"), a German patriotic song. The words were written by Max Schneckenburger in 1840, when the left bank of the Rhine seemed in danger of falling into the hands of

France. The music, by Karl Wilhelm, was composed in 1864.

WACO, TEX, the county seat of McLennan County, located ninety-seven miles southwest of Dallas, on the Brazos River and on the Texas Central, the Missouri, Kansas & Texas, the Saint Louis Southwestern, the Missouri Pacific, and the Southern Pacific railroads. There is a well-equipped airport, Rich Field. Water with medicinal properties obtained from artesian wells makes the city a popular health resort. It is surrounded by an agricultural and stock raising district, and is the center of a large wholesale business. There are grain elevators, flour mills, cotton and woolen mills, foundries, machine shops, bottling works and packing houses. Notable buildings are the Waco Natatorium, a Federal building, a Carnegie Library, courthouse and Masonic Temple. Baylor University, Sacred Heart Academy, and Paul Quinn College are located here.

Waco was laid out in 1849 and was incorporated the next year. It has adopted the city manager form of government. Population, 1920, 38,500, in 1930, 52,848, a gain of 37 per cent.

WADAI, *wah'di*, formerly a native state in the central part of Africa, annexed to the French Congo in 1909. The boundaries are indefinite, but the area is estimated at 170,000 square miles. The surface is mostly of a desert character, but there are oases scattered through the region, and in some sections there are fertile tracts covered with forests. The population, estimated at 2,000,000, is composed chiefly of negroes and Arabs, who are Mohammedans. The capital is Abeshr, and it is connected with Bengazai by caravan route.

WAGER, *wa'jur*, a bet, also something staked on any uncertain outcome of an issue, such as the result of a contest, or the m-

evitable alternative in events, such as elections and the weather. The party whose opinion proves to be correct receives what has been staked by both. By statutes of England, Scotland and the United States, all contracts or agreements, whether oral or in writing, depending on wagers, are null and void, and money due thereon cannot be recovered in any court of law. A wager is therefore called a *debt of honor*, since it cannot be collected except through the good faith of the parties.

WAGES, *wô'jes* In modern industry production requires land, capital and labor. The payment for land is *rent*; the payment for capital is *interest*, and the payment for labor is *wages*. In the common meaning of the term *wages* is the money one man receives for working for another. Wages may be classified as *nominal* and *real*. Nominal wages are the wages expressed in money, or as an absolute quantity, as five dollars a day. Real wages denote the purchasing value of the money received. To illustrate. If the cost of living advances and a laborer's wage remains the same, his real wage is lowered. If a bricklayer who received five dollars a day during a certain year received the same wage in a later year when living costs were 50 per cent greater, his real wage then was only two-thirds of what it was in the first instance. To enable him to maintain his standards, his later wage would have to be increased to seven and one-half dollars.

Difference in Wages In economics, labor is considered as a commodity, the same as land, building material or wheat, and one of the chief causes in fixing wages is the law of supply and demand, other conditions being equal. When there are more laborers than production requires, wages will be low, when laborers are scarce, producers bid for their services, and wages are high. Wages in some occupations are higher than in others because of the nature of the occupation. Permanency of occupation, for instance, is an important factor in fixing wages. One can afford to work for a lower wage at an occupation which furnishes employment the year round than at an occupation which furnishes employment only part of the time. Skilled labor commands higher wages than unskilled labor, and dangerous occupations higher than those not considered as dangerous.

Wages and Profit Sharing. Many large firms distribute periodically among their employes a certain per cent of their profits

From the viewpoint of economics, their share of profit should not be considered as wages, but from the practical viewpoint of both employer and employe it is considered as so much additional compensation, or so much increase of the laborer's share of production.

Influence of Labor Organizations Labor organizations have in many instances secured higher wages for their members than could have been secured without organization, because the organization can resort to collective bargaining and force upon employers terms that the workmen individually cannot secure. On the other hand, the uniformity of wages thus secured may work injustice to the most efficient laborers, who under individual initiative could increase their output and are thus deprived of their full share of production.

The Wage Problem. The problem of wages is always before the industrial world, and it is the supreme cause of conflict between capital and labor. There are those who believe that capital and labor are and ever must be antagonistic, and that the capitalist class should be dispossessed of their property. The socialists claim that all sources of production should be the property of the state and that the laborer should receive all the profits for his work. Present legislation is toward more settled relations between capital and labor, and toward just compensation of laborers.

Related Articles. Consult the following titles for additional information:
Capital Profit Sharing
Labor Organizations Socialism

WAGNER, wâh'g'nur, WILHELM RICHARD (1813-1883), a German composer, poet and miscellaneous writer, born at Leipzig. He received his education at Leipzig and Dresden and after 1834 filled various musical engagements at Magdeburg, Riga and Königsberg. In 1839 he went to Paris and London and there composed his operas *Rienzi* and *The Flying Dutchman*. The brilliant success of the operas secured him the conductorship at the Royal Opera of Dresden in 1843. He joined the



WILHELM RICHARD
WAGNER

insurrectionary movement of 1848 and was compelled to exile himself. Until his return to Germany, in 1864, he spent most of his time in Switzerland, Italy, Paris and London. His *Tannhauser* and *Lohengrin* appeared in 1845 and 1850, respectively. The king of Bavaria, Louis II, became an enthusiastic patron of Wagner, and the theater at Bayreuth, especially built for Wagner by the contributions of Wagner societies throughout the world, was chiefly supported from the king's purse. Here the famous tetralogy *Der Ring des Nibelungen*, consisting of *Das Rheingold*, *Die Walküre*, *Siegfried* and *Götterdämmerung* was first performed in 1876. About a year before his death Wagner wrote *Parasol*, which has since been produced with emphatic success. He gave to his works a national character by selecting his subjects from old German legends. His theory, founded upon the ideas of Gluck and Weber, was that in a perfect musical drama, the three arts, poetry, music and dramatic representation, should be welded together into one well-balanced whole. His particular views on music are embodied in a well-known work, entitled *Oper und Drama*. See **OPERA**.

WAGON, a four-wheeled vehicle drawn by one or more horses and used for carrying passengers or merchandise. In cities they have been almost entirely displaced by motor trucks. Wagons are constructed of a great variety of patterns, the body being adapted to the particular use for which the vehicle is intended. Farm wagons have long rectangular boxes, so made that they can be taken off or put on the gear at will. Most of these wagons may also have the running-gear extended or shortened to suit the purpose for which the wagon is needed. Road wagons have a light running-gear, springs and upholstered seats. For practically every purpose, even in rural districts, the motor vehicle is supplanting the wagon. See **CARRIAGE**.

WAGTAIL, a group of birds so called from their habit of jerking their long tails when running or perching. Though several species are common in Europe, rarely is the bird seen in the United States. The wagtails frequent muddy lands and pastures, running rapidly along the edge of water and catching the insects they find there. A species of wagtail breeds on the coasts of Alaska in summer, making its nest of woven roots and grasses on or near the ground. The eggs are white with brown spots.

WAITE, MORRISON REMICK (1816-1888), an eminent American jurist, born at Lyme, Conn. He graduated at Yale in 1837 and was admitted to the bar two years later. He practiced successfully in Maumee City and Toledo, Ohio, was elected to the legislature and in 1871 was sent to Geneva as United States counsel in the Alabama case. President Grant appointed him to succeed Salmon P. Chase as Chief Justice of the Supreme Court of the United States in 1874. He held the position until his death, winning esteem for his impartiality and learning. Among the important questions presented to the Supreme Court and decided during Chief Justice Waite's term were those affecting polygamy, election laws, the civil rights of negroes, the Bell telephone case, the power of removal by the President and the Chicago anarchist cases.

WAKE, the name given to the custom of holding vigil over the dead during the night preceding burial. While it is a part of the practice of numerous religions, in America it is witnessed only among Roman Catholics. The wake originally was observed in the Church of England, it had nothing to do with death, but was observed with prayer and singing to commemorate the anniversary or consecration and dedication of the parish church.

WAKE ISLAND, a tiny coral island in the Pacific Ocean designated as a regular station on the air line from California to Manila. It lies nearly 2,000 miles west of Hawaii, and belongs to the United States. Next to Guam it is the farthest outpost of the republic before the Philippine Islands are reached. Wake is 1,200 miles southwest of Midway Islands, 1,450 miles northeast of Guam, and about 2,950 miles from Manila. The island is not attractive, but its location is favorable for a communications depot. There is a wireless plant, and as a station on the air line it will be equipped with emergency repair shops. See map, article **PACIFIC OCEAN**.

WAKE-ROBIN, another name for the titlun (which see).

WALDENSES, *wal den's sess*, a Christian sect founded in the twelfth century by Peter Waldo, a rich merchant of Lyons, France. About 1170 Waldo gave away his goods and his money to the poor and began preaching a life of poverty, chastity and obedience. While holding to the Roman Catholic faith,

he believed the people should be preached to in their own dialects, that religious writings should be translated into their language, and that each man should be his own interpreter of the Bible. His followers, known as "the Poor Men of Lyons," suffered many persecutions, and in 1231 were excommunicated by the Pope. Their chief strongholds then as now, were the Cottian Alps, southwest of Turin. Since 1848 they have had the same religious and political rights as other religious sects in Italy, where they number about 12,000. Branches of the Church have been established in Argentina, Uruguay and the United States.



A typical costume

WALES, *waile*, the smallest division of Great Britain, situated in the southwestern part of the island, forming a peninsula between Bristol Channel, on the south, and the Irish Sea, on the north. It has an area of 7,466 square miles, or a little less than that of New Jersey. Population, 1931, 2,158,374. Its surface is mountainous in the north, where the ranges are an extension of those of England. The country is rich in minerals, particularly coal, iron, copper and slate,

and to these Wales owes its chief wealth. The coal trade is the most important and extensive, and the city of Cardiff on the Bristol Channel is one of the largest coal ports in the world. The presence of coal and iron ore has given rise to extensive iron and steel works, and there are also important copper plants. Other manufactures include woolen goods, especially flannel, coarse cloth and hosiery.

Previous to the Roman occupation, Wales appears to have been inhabited by a mixture of primitive Iberians and invading Celts. During the latter part of the Roman occupation one of the four provinces into which the entire island was divided included Wales and was called *Britannia Secunda*. After the invasion of the Saxons the country acquired a distinctly national character, becoming the refuge of the Celts, or early Britons, who were gradually driven to the west. The country was conquered in the thirteenth

century by Edward I, who made his eldest son Prince of Wales, a title that has ever since been conferred upon the heir to the British crown. Succeeding this date there occurred a number of national uprisings, and the struggle for independence in Wales was not entirely suppressed till 1536, when the country became incorporated with England, and its inhabitants received all the privileges of English subjects. The language is Welsh, which is a branch of the Celtic, different from that used by the Irish and the Scotch Highlanders. The political and educational systems of Wales are identical with those of England. See **ENGLAND**, **GREAT BRITAIN**; **CELTS**.

WALES, PRINCE OF, a British title borne by the eldest son of the British monarch. It was first conferred by Edward I on his son, at the time of his conquest of the principality of Wales. Edward III was never Prince of Wales, but the title has been conferred on all the male heirs apparent to the English throne from the time of Edward the Black Prince, son of Edward III. The title is not hereditary, but is purely honorary; it does not pass to the holder automatically, but must be conferred with appropriate ceremony. It implies no power or authority, and the accompanying income is voted by Parliament.

As heir to the crown of Scotland, the Prince of Wales bears the titles of *Prince and High Steward of Scotland, Duke of Rothesay, Earl of Carrick, Baron of Renfrew, and Lord of the Isles*.

The title was bestowed on the present Edward VIII in June, 1910, three months after his father, George V, ascended the throne. Unless Edward VIII marries and is given a son, there will be no Prince of Wales during his reign.

WALHALLA, *wahl-hah'la*, or **TEMPLE OF FAME**, a magnificent marble palace erected in 1830, near Ratisbon, Bavaria, by Ludwig I. The building, 115 by 246 feet in size, is in a style similar to Greek Doric. The pediments and frieze contain sculptures representing scenes from the early history of the Teutonic peoples, and inside are busts of noted Germans. The building is named for Walhalla, the mythological hall of the Norse deities.

WALKER, FRANCIS AMASA (1840-1897), an American economist and statistician, born at Boston, Mass., the son of Amasa Walker. He graduated at Amherst College and after-

ward studied law. He served in the Union army in the Civil War and was made brigadier general for gallantry at Chancellorsville, where he was wounded. From 1865 to 1867 he taught Latin and Greek at Williston Seminary, and in 1869 he was appointed chief of the bureau of statistics at Washington. As supervisor of the census of 1870, as United States Indian Commissioner in 1872 and (from 1873 to 1881) as professor of political economy in the Sheffield Scientific School of Yale College, he rendered distinguished service. In 1881 he became president of the Massachusetts Institute of Technology. He published many works, including volumes on the *Indian Question*, *Political Economy*, *The Wages Question*, *Money*, *International Bimetallism* and *The Making of the Nation*.

WALKER, WILLIAM (1824-1860), an American adventurer, notorious as a leader of several filibustering expeditions. He was born at Nashville, Tenn., and was graduated at the University of Nashville. After a course in law he was admitted to the bar, and later he studied medicine at the universities of Edinburgh and Heidelberg. On his return to America he engaged in journalism.

In the summer of 1853 Walker organized an expedition to conquer the state of Sonora, Mex. Forced to flee from Mexico on account of a lack of provisions and ammunition, he was arrested by United States authorities at San Diego, and was tried for violating neutrality, but was acquitted. He then conducted expeditions in Nicaragua and Costa Rica, and each time was driven out. After several attempts to conquer Honduras, he was compelled to surrender to the Honduran government, was condemned by court martial and executed. See *FILIBUSTER*.

WALKERVILLE, ONT., on the Canadian National, the Wabash, the Michigan Central and the Pere Marquette railways, one and one-half mile from Windsor, and directly across the river from Detroit. Steamship lines run to Fort William, Port Arthur, Montreal and intermediate points. The industries of the town are supplied by Niagara electric power; there are varnish and paint factories, wire fence works, bridge works, tobacco, clothing and chemical works, and manufactories of automobile bodies and trimmings, furnaces, castings and marine engines. Population, 1931, 10,105.

WALKING STICK, a name applied to a group of curiously-shaped insects, which closely resemble a small branch with twigs. In the southeastern part of the United States is found a typical species. The individuals have long, slender bodies and long, thin legs. They are green in summer, but turn brown in autumn, thus protected from detection; they escape all but the closest scrutiny. The local names are *devil's horse* and *mule killer*. See *LEAF INSECTS*, *PROTECTIVE COLORATION*.

WALLACE, ALFRED RUSSEL (1822-1913), an English naturalist, born at Usk, Monmouthshire, and educated at Hertford Grammar School. He spent many years in traveling, especially in South America and the Asiatic islands, and the valuable material collected in these scientific explorations he embodied in *Travels on the Amazon and Rio Negro*, *The Malay Archipelago*, *Tropical Nature* and *The Geographical Distribution of Animals*. His observation of animal life and his philosophical nature led him to investigations which resulted in the formulation of a theory of natural selection and evolutionary development. Before Darwin gave his famous work to the world Wallace had published his *Speculation on the Origin of Species*. His share in establishing the theory of evolution has been acknowledged by Darwin. But while Darwin, in his later editions of the *Origin of Species*, somewhat modified his original conclusions, Wallace, in a late work, *Darwinism, an Exposition of the Theory of Natural Selection, with Some of its Applications*, strongly insists upon the complete controlling power of these primary laws and conditions. Moreover, he differs from Darwin on the subject of the intellectual, moral and spiritual nature of man. He contends that the higher faculties have been developed, not under the law of natural selection, but under a higher law, which has come in imperceptibly, and he maintains that the Darwinian theory, instead of opposing, "lends a decided support to a belief in the spiritual nature of man."

He claimed to be a true Darwinian.



ALFRED RUSSEL
WALLACE

WALLACE, EDGAR (1875-1932), an English newspaper man and novelist who issued his books with almost incredible rapidity. He was a war correspondent and special writer for London papers before turning exclusively to the more formal literary field. His novels, most of them mystery stories, were often written at the rate of one in ten days or two weeks, and in all they totalled more than 160. Though showing evidence of hurried composition, they found an immense sale in all English-speaking countries. Wallace was engaged to write for American moving-picture producers in 1931, in Hollywood, Calif., while engaged on scenarios, he died in the following year.

WALLACE, LEWIS (1827-1905), an American soldier and novelist, generally known as Lew Wallace. He was born in Brooksville, Ind., received a common school education and began the study of law, which he practiced at intervals in Crawfordsville, Ind. He took part in the Mexican War, with rank of lieutenant, and was a member of the Indiana state legislature in 1848. At the outbreak of the Civil War he entered the service as colonel of an Indiana regiment, was appointed brigadier-general in 1861 and was made major-general for distinguished services at Fort Donelson in 1862. He was removed from command by Halleck, but was reinstated by Grant. He was sent to Mexico on secret diplomatic service in 1866, was elected governor of New Mexico in 1878 and was made minister to Turkey in 1881. His best-known works are *Ben Hur*, *The Fair God*, *The Prince of India* and *The Boyhood of Christ*.

WALLACE, WILLIAM, Sir (about 1272-1305), the first of the great Scottish patriots, a man of herculean proportions and strength and possessing in a high degree those qualities of leadership which made his name famous. The king of England deposed the Scottish king in 1296 and placed over Scotland a guard of English soldiers. Wallace one day quarreled with and killed one of these soldiers, and escaped. He gathered a band of Highlanders and began a guerilla warfare on the English.

After collecting a considerable force, he was besieging the castle of Dundee when he heard that Surrey and Cressingham were advancing upon Stirling with a large army. He met them in the vicinity of that town and gained a complete victory (1297). After

this Wallace gained the title of guardian of the kingdom and conducted a series of organized raids into England. In 1298 Edward I entered Scotland, and Wallace retired before him, wasting the country, but he was at length overtaken at Falkirk and was compelled to fight, after a gallant resistance, he was defeated. He succeeded in escaping, and little is known of his movements thenceforth. He was excluded from the peace granted by Edward to the Scots in 1304, and when he fell into the hands of the English he was conveyed to London and there executed as a traitor, though it was admitted that he had never sworn fealty to England.

WALLA WALLA, *wol'a wol'a*, WASH., commercial center of the southeastern part of the state, county seat of Walla Walla County, situated 200 miles southwest of Spokane on the Walla Walla River, and the Northern Pacific and Union Pacific railroads. There is an airport. It is thirty miles east of the navigable Columbia River, and a hard-surfaced road has been constructed from Walla Walla to Wallula, the nearest port, to connect with boat lines. Walla Walla is beautifully located in the midst of a fertile valley which produces 5,000,000 bushels of wheat annually, besides extensive fruit, vegetables, live stock and dairy and poultry products.

Whitman College, located here, has been established eighty years and is one of the best known institutions of higher education in the Northwest. Another well-known school is Walla Walla College. The city has a state armory, the state prison, and a veterans' hospital.

Walla Walla, a term which means *pushing water*, grew up about a military post, established in 1856, and was at first known as Steptoe City. In 1868 it was chartered under the present name. The commission form of government is in operation. Population, 1920, 15,503, in 1930, 15,976.

WALLENSTEIN, *wahl'en stein*, or **WALDSTEIN**, *ALBRECHT EUSEBIUS WENZEL VON*, Duke of Friedland, Sagan and Mecklenburg (1583-1634), a famous leader in the Thirty Years' War, born at Herrmann, in Bohemia, of poor but noble parentage. He was educated in a Jesuit College and at the universities of Padua, Altdorf and Bologna. Through a wealthy marriage he became prominent in affairs in Bohemia. For

military service against Venice in 1617 he was made a count and commissioned a colonel. He took service in the Austrian army in the struggle against the Turks, and when the Thirty Years' War broke out in Bohemia (1618), he joined the imperial forces against his native country.

In September, 1630, owing to the jealousy of the nobles and the license of his followers, he was deprived of all command and retired to his duchy of Friedland, until the emperor was compelled to seek his aid against Gustavus Adolphus. Wallenstein then obtained almost absolute power, and his behavior thenceforth leaves no doubt that the emperor's interests were second to his own, and that he would not have hesitated to join the emperor's enemies, to secure his own independence and the crown of Bohemia. After some partial successes he encountered the king of Sweden at Lützen in 1632, and in the battle which took place Wallenstein was defeated and Gustavus was killed. Wallenstein had unsuccessfully treated on his own account with the Swedish king, and he now secretly reopened negotiations with France and the German princes, occasionally taking the field to display his military power. The court at Vienna was well aware of his double dealing, but the emperor was not strong enough to remove him, and he therefore had him assassinated. See THIRTY YEARS' WAR.

WALLFLOWER, a shrubby herb, belonging to the mustard family, native to Southern Europe, so called because it is often found growing among the stones of fallen walls. It thrives in dry soil and gravel and grows well on stony cliffs. The flowers in the wild state are invariably yellow, under cultivation they exhibit a variety of colors. A red specimen is known as bleeding heart *Heartsease* and *gillyflower* are other names by which the plants are known. The fragrant, velvety flowers are much admired, and have gained for the plant a place in Northern hothouses.

WALL OF CHINA, THE GREAT. See GREAT WALL OF CHINA.

WALLOONS, *wal loons'*, a Celtic race inhabiting Southern Belgium. They are the descendants of the ancient Belgae and resemble the French more than they do the Germans, being short and mostly of dark complexion. Their language, also called Walloon, is a French dialect, retaining numerous

Gallic words, but it varies somewhat in the different provinces. There are about 2,750,000 Walloons now in Belgium.

WALL PAPER, paper used for decorating the walls and ceilings of rooms. It was invented by the Chinese about 2,000 years ago, but was unknown elsewhere until about the year 1350, when importations from China reached Europe. The first factory for its manufacture in Europe was built in France in 1750. The French still call it *papier peint*, because for many years in that country it was hand-painted. It came into quick popularity in Europe as a substitute for the expensive tapestries, brocades, and velvets that were the wall adornments of the wealthy. Today more wall paper is made in the United States than in any other country, its production there reaching 325,000,000 rolls a year, enough to put a belt almost sixty times around the world. European manufacturers still adhere quite largely in choice of patterns to copies of tapestries and historic and mythological designs, but American stylists specialize in new designs, one American manufacturer produces about 3,000 different styles of prints. The design in the sheet, which is printed on presses resembling printing presses, is repeated at intervals, and when the paper-hanger puts it on the wall he is careful to match the pattern.

WALL STREET, the center of financial operations in the United States, so called from the street in lower New York City, upon which are located the New York Stock Exchange, the Consolidated Exchange and numerous banking institutions that figure largely in the money market. The street itself extends from Broadway to East River, following the line of the old city wall built by Governor Peter Stuyvesant in 1653 to protect the town from possible attacks by the Indians. This wall, repaired and replaced from time to time, formed for fifty years the northern boundary of the future metropolis of the Western world.

WALNUT, *waw'nut*, a genus including about twelve species of beautiful trees, mostly natives of North America and Asia. The three best-known species in America are the *English*, or *Persian* walnut, the *black* walnut and the *white* walnut, or *butternut*.

The English, or Persian walnut is a native of Persia and the Himalaya region, and is extensively cultivated on the California coast and in Southern Europe. It is a handsome

tree, attaining a height of from sixty to ninety feet. It yields a sweet sap, somewhat like that of the sugar maple. The nut, which grows in a thin, wrinkled, two-valved shell, has a high food value, being a greater heat producer than almost any kind of meat. The unripe nuts are much used for making pickles and ketchups. The wood called Circassian walnut, is valuable for cabinet work. It has been much used for interior finishing and for furniture, but is becoming rare. A beautiful brown dye obtained from the bark and the husks of the nuts has been much employed in staining lighter woods.

The nuts, which are encased in a woody shell, are deliciously flavored, but are of comparatively little commercial importance because the oil in them soon becomes rancid.

WALPOLE, *waw'l-pole*, HORACE, SIR, fourth Earl of Orford (1717-1797), an English man of letters, the son of Sir Robert Walpole. He received his education at Cambridge, and following his graduation spent several years in travel. In 1741 he entered Parliament. His first publication was *A Catalogue of Royal and Noble Authors*, which was followed in 1764 by *The Castle of Otranto*, a romance abounding in mystery, which was at the time of its publication very popular. Walpole is, however, chiefly remembered for his *Letters*, which gave entertaining pictures of the society of his day. While in general these pictures are true to life, they contain many inaccuracies.

WALPOLE, HUGH (1884-), an English novelist, biographer, and lecturer, born in New Zealand and educated at Cambridge University. When he turned to literature, his first novel, *The Wooden Horse*, was not well received. Undaunted, he followed this effort with others which won him great favor, and brought rare perfection of style. Probably his most famous works are the series of *Rogue Herries* novels. In addition to more than a dozen books of fiction, he wrote several volumes for children, with *Jeremy* as the leading character in each, and biographies of Joseph Conrad and Anthony Trollope. In Canada and the United States he made timely appearances on the lecture platform.

WALPOLE, ROBERT, SIR, first Earl of Orford (1676-1745), an English statesman. He was educated at Eton and at King's College, Cambridge, succeeded to his father's estate in 1700 and entered Parliament as

member for Castle Rising. In 1702 he was elected for King's Lynn, became an active member of the Whig party and soon distinguished himself by his business capacity and by his ease in debate. He was successively Secretary of War, paymaster of the forces and First Lord of the Treasury, Chancellor of the Exchequer and Prime Minister. This latter office he held for over twenty-one years, and, during his long administration the Hanoverian succession became firmly established, owing largely to his prudence and political sagacity.



THE WALRUS

WALRUS, *wol'rus*, a marine flesh-eating mammal, related to the seal, and inhabiting the colder climates. It is larger and heavier than the seal, and when full-grown will measure twelve feet in length, and weigh about 2,000 pounds. When young, it is covered with thick, dull brown fur, but as it gets older this falls out, and when full-grown the walrus has practically no fur or hair on his wrinkled skin. The most characteristic feature of the walrus family is the pair of large pointed tusks (canine teeth) which project downward from the upper jaw. These tusks are of solid ivory, and are often from 20 to 30 inches in length. They are used both as tools and as weapons,—to dig up clams and other food, to climb on ice and rocks, and to defend themselves from foes, especially from the polar bear, their chief enemy. Two species are found, one in the Atlantic—in Greenland and Labrador, one in the Pacific—in the islands of Behring Sea, but their numbers are diminishing rapidly. They are hunted for their hides and oil, and for ivory, and by the natives on the Arctic coasts for food. They are either killed with the rifle or taken with harpoons.

WALTHAM, *wol'tham*, MASS., a city in Middlesex County, ten miles west of Boston, on the Charles River. It manufactures more watches than any other city in Massachusetts; its watch factories are among the

largest in the world. There are also large cotton mills, shoe factories, paper-bag mills, machine shops and foundries. It has a state armory and a public library. It was originally a part of Watertown, but was made a separate town in 1788. The mayor-council form of government is in operation. Population, 1920, 30,891, in 1930, 30,247.

WALTON, *waw'ton*, IZAAK (1593-1683), the author of the famous *Compleat Angler*, a treatise on fishing. For a number of years he was in business in London, as a linen draper according to some accounts, as an ironmonger according to others. He retired at the age of fifty and devoted his remaining forty years to a life of cultured ease and pleasure. His first edition of *The Compleat Angler* appeared in 1653. It is to his exquisite delineations of rural scenery, the ease and unaffected humor of his dialogue and the delightful simplicity of his style that *The Compleat Angler* owes its charm.

WALTZ, *waw'ts*, a dance of Bohemian origin, executed with a rapid whirling motion, the gentleman having his arm round his partner's waist. The music is written in triple time and consists of phrases of eight or sixteen bars. Several of these phrases are now usually united, to prevent monotony. Johann Strauss and his son of the same name are the most noted composers of waltzes. The *valse à deux temps* is a form of waltz in which two steps are made to each bar of three beats. *Classical waltzes* are musical compositions in waltz form, not intended for dance tunes. Of this style the composer Chopin is the greatest master.

WAMPANOAG, *wom pa no'ag*, a tribe of Algonquian Indians who once occupied the lands east of Narragansett Bay, as far north as Massachusetts. Their number was reduced from 30,000 to barely 1,000 by a fearful epidemic, and a subsequent war with the whites resulted in their complete destruction. Massasoit and his son Philip were famous men of the tribe. See MASSASOIT, KING PHILIP.

WAMPUM, *wom'pum*, white and purple shell beads used for ornament and circulated in colonial days as money among Indian tribes east of the Mississippi. Because of the fixed value given to wampum strings, they came to be accepted by the New England colonists in exchange for their own coins. In some localities six wampum beads

equalled a penny. It was the custom of the Indians to weave wampum beads into belts, in such a manner that the figures formed permanent records. Few transactions of any sort were considered complete without the passing of the belts, and wampum records were invariably used in the ratification of treaties. Many wampum belts of historic importance are preserved in the state archives at Albany, New York.

WANAMAKER, *wahn'a ma lur*, JOHN (1838-1922), an American merchant, capitalist and philanthropist. He was born in Philadelphia, Pa., and there received a common school education and began his business career as errand boy in a book store, later he was a salesman, and in 1861 he established a clothing house, which he enlarged into a general department store in 1876. In 1896 he opened a branch in New York City.

He helped to organize the Christian Commission, which assisted the soldiers during the Civil War, was chairman of several relief committees, and was prominent in the management of the Centennial Exposition. Wanamaker was appointed Postmaster-General in 1889 and performed his duties with energy and administrative ability. He also took great interest in religious work and actively supported the Young Men's Christian Association. As one of the founders of the Presbyterian Hospital and Bethany Dispensary, as originator and president of the first Penny Savings Bank and as a donor to numerous charities he was one of the most influential men of his time.

WANDERING JEW. A legend, well known in almost all parts of the Christian world, says that while Christ was on his way to Calvary, bearing his cross, he was mocked by a Jew, who told him not to rest, but to hurry on with his burden. In reply, Christ said, "I go, but thou shalt tarry till I come." In consequence, the man has continued since to wander about the earth. He passes through his lifetime like any ordinary man, till he reaches one hundred years, and then he suffers a terrible sickness, after which he comes forth again young. This legend has been the subject of many literary works in prose, poetry and the drama. The most notable novel is *The Wandering Jew* by Eugene Sue.

WANDERING JEW, a creeping plant with glossy leaves having a silvery sheen and often a purplish cast. It grows in almost

any soil, and even in water, and the persistency with which it lives and its manner of growth are responsible for the name. The plant grows and spreads rapidly and is used to advantage in hanging baskets and along the sides of window boxes. In the warmer of the temperate climates the plants live out of doors and often attain a length of several yards.

WAPITI. See **ELK**.

WAR, *war*, a contest between nations or states (international war), or between parties in the same state (civil war), carried on by force of arms. It usually arises in the first case from disputes about territorial possessions and frontiers, unjust dealings with the subjects of one state by another, economic competition and oppression, questions of race and sentiment, jealousy of military prestige or mere lust of conquest. Nearly all civil wars are due to the claims of rival contenders for supreme power in the state, or to attempts to establish some important point connected with civil, religious or political liberty. In all cases the aim of each contending party is to overthrow or weaken the enemy, by the defeat or dispersion of his army or navy, by the occupation of important parts of his country, or by the ruin of his commerce, thus cutting off his resources of recuperation. In practically every instance, propaganda, much of it patently false, fuses the fever for conflict.

When war is carried into the territory of a hitherto friendly power, it is called an *aggressive*, or *offensive*, war; and when carried on to resist such aggression, it is called *defensive*. Previous to the outbreak of hostilities between states, the power taking the initiatory step may issue a *declaration of war*, which now usually takes the form of an explanatory manifesto, addressed to neutral governments (see **WAR, DECLARATION OF**).

During the progress of the struggle, certain laws, usages or rights of war have come to be generally recognized, such laws permit the destruction or capture of armed enemies, the destruction of property likely to be serviceable to them, the stoppage of their channels of traffic and the appropriation of everything in an enemy's country necessary for the support and subsistence of the invading army. On the other hand, though an enemy may be starved into surrender, wounding, except in battle, mutilation and all cruel and wanton devastation

are contrary to the rules of war, as are also bombarding an unprotected town, the use of poison and the employment of torture to extort information from an enemy. Works of art and the industries of peace are usually considered as exempt from destruction. The World War, however, showed that in actual conflict all these rules may be disregarded by a wanton adversary. A remorseless and cruel nation breaks every humane rule, and its opponents may retort with "reprisals." The supreme problem before civilization at the present time is not the mitigation, but the abolition of war.

When two nations are at war and it becomes necessary for them to communicate, it is customary to request the services of the embassies of some neutral powers, and the belligerents themselves do not meet until preliminary arrangements have been made by the neutrals, as, for instance, in the Russo-Japanese War, negotiations were carried on by the government of the United States. While terms of peace are being considered, or when for any reason the belligerents wish to meet, an *armistice*, or *truce*, is declared, during which there is a cessation of hostilities.

If one nation completely conquers another, the war ceases, though many matters must subsequently be settled by a *treaty* or by *grant*. The World War peace treaty (1919) was the latest of the many notable agreements that have followed wars since civilization began. While as a whole treaties are based on the assumption that there will always be other wars, some of their provisions usually recognize the possibility of preventing war.

Related Articles. Consult the following titles for additional information:
Army **Navy**
International Law **Neutrality**

WAR, DECLARATION OF, a formal announcement by one nation of its intention to begin hostilities against another, or a statement recognizing the existence of a state of war between the two nations. Under modern conditions, with such facilities for rapid communication as the telephone, the wireless telegraph, the ocean cable, etc., actual warfare is preceded by negotiations of longer or shorter duration. It sometimes happens that hostilities begin without a formal declaration, as in case of the Russo-Japanese War and Italy's assault on Ethiopia. A common procedure is for one nation to send

an ultimatum to the other, setting a definite time for a reply. In 1914, for example, Great Britain sent an ultimatum to Germany on August 4, demanding a reply to its request that Belgian neutrality be respected, and requiring an answer by midnight of the same day. Germany's failure to reply was followed by a war declaration on the part of Great Britain. The war resolution by which the United States entered the World War was a statement that war existed between the two countries because of illegal acts on the part of Germany. See WAR, WORLD WAR.

WAR, DEPARTMENT OF, that one of the executive departments of a government which has to do primarily with military affairs. The chief of the department in the United States is the Secretary of War, who is a member of the President's Cabinet. He carries out the orders of the President, who is commander in chief of the army. The War Department consists of a number of different bureaus, over the chiefs of which the Secretary has general control. The affairs of the War Department, however, are not confined strictly to military matters, for it exercises control over pensions, sea coast forts, river and harbor improvements, the military academy and the government of island possessions which require military supervision. The principal bureau chiefs are the adjutant-general, the inspector-general, the judge-advocate-general, the quartermaster-general, the commissary-general, the sergeant-general, the paymaster-general and the chiefs of ordnance, signal office, engineers and pensions. The department was created by act of Congress in 1789.

WARBLERS, a family of tiny, insect-eating birds, found throughout the western continent, about seventy species of which reach the United States. Their migration northward is made with great regularity, and in May and early June they are commonly observed everywhere in the Northern states. In nesting, however, most species seek the deep woods, some penetrating as far northward as the Hudson Bay and Yukon regions. Nearly all spend the winter in the tropics.

Some of the better known species of warblers are the *yellow warbler*, or *summer yellow bird*, which remains about Northern homes and parks throughout the summer, the *black and white warbler*, which creeps about the branches of trees in early spring,

the *myrtle warbler*, marked with four yellow patches on head, rump and wing, the *black-throated green* and the *black-throated blue warblers*, the *chat*, the *American redstart* and the *oven bird*. Some warblers have fine singing voices, but the greater number have only weak, haping notes. Their nests are usually cup-shaped, woven of twigs and grasses and placed in trees or bushes. The eggs are from three to five in number.

WARD, a minor who has been placed under a guardian appointed by the courts and who becomes legally responsible for the protection of his rights. The child must obey his guardian, he may not marry without his consent and may not bring suit against him, though in cases of unjust treatment he may file a complaint with the court. In most cases wardship ceases with marriage and always when the ward becomes of legal age. See GUARDIAN.

WARD See MUNICIPAL GOVERNMENT.

WARD, ARTEMUS See BROWNE, CHARLES FARRAR.

WARD, ELIZABETH STUART PHELPS (1844-1911), an American author and philanthropist, born at Andover, Mass. Besides lecturing and engaging in work for the advancement of women and for social reforms, she also wrote a number of stories, including *The Gates Ajar* (1868), which passed through twenty editions in the year of its publication, *Beyond the Gates*, *The Gates Between*, *Hedged In*, *The Silent Partner*, *The Story of Avis*, *A Singular Life* and, in conjunction with her husband, the Rev. Herbert D. Ward, *Come Forth* and *The Master of the Magicians*.

WARD, MRS HUMPHRY (1861-1920), one of the foremost woman novelists of twentieth-century England. She was born in Tasmania and was reared and educated in England. In 1872 she married Thomas Humphry Ward, a journalist. Matthew Arnold was her uncle.

After writing much for periodicals and publishing two works of fiction, which were not especially noteworthy, she brought out in 1888 *Robert Elsmere*, a novel which became immensely popular and which won the favorable notices



MRS HUMPHRY
WARD

of critics. Then followed *The History of David Greave, Marcella, The Story of Bessie Costrell, Sir George Tressady, Helbeck of Bannisdale, Eleanor, Lady Rose's Daughter The Marriage of William Ashe, The Case of Richard Meynell, Eltham House, Missing, Elizabeth's Campaign and Helena* (1920). The principal criticism passed on Mrs Ward's novels, especially on her earlier ones, is that the purpose is made too prominent and that in all there is too great similarity of leading characters. But her characters are clearly drawn, her literary execution is excellent and her topics are always vital and timely.

WARD, JOHN QUINCY ADAMS (1830-1910), one of the foremost American sculptors of his day, was born at Urbana, Ohio. Before the Civil War he established himself in New York, and became known for his portrait busts of notable people. His statuette *The Freedman*, made in 1865, was so popular that thousands of copies were sold, his *Indian Hunter*, which also makes a strong popular appeal, was the first piece of statuary erected in Central Park, New York City. *The Good Samaritan*, a group commemorating the discovery of the efficacy of ether as an anæsthetic, is in Boston. Ward's bronze bust of Shakespeare, a seated figure of Horace Greeley and statues of George Washington and Thomas Jefferson are among his finest portrait statuary. Ward was identified with the leading art organizations of his time and labored unremittingly to elevate national ideals in the field of art endeavor.

WARFIELD, DAVID (1866-), an American actor who has achieved the highest success in several character portrayals. He was born at San Francisco and in that city began his stage career at a local theater at the age of twenty-two. He went to New York in 1890, in the ten years following he was connected with the Casino Theater and with Weber and Fields' Music Hall. Later attracting the attention of David Belasco, Warfield was starred in *The Auctioneer*, one of his greatest successes. He was equally successful in *The Music Master*, and thus placed him in the front rank of American actors. His later performances have been in the leading rôle of *The Return of Peter Grimm* and as "Van der Decken" in the play of the same name, based on the legend of *The Flying Dutchman*. Warfield's impersonation of an eccentric but kindly old

gentleman, pathetic and courageous in misfortune, has never been excelled by any American actor.

WARNER, CHARLES DUDLEY (1829-1900), an American editor and critic, born at Plainfield, Mass. He received his degree at Hamilton College in 1852, was admitted to the bar and for a time practiced law in Chicago. Entering journalism, he became, in 1860, editor of the *Hartford Press* and later of the *Courant*. As correspondent of American papers he made an extensive tour of Europe, and on his return, in 1884, he became one of the editors of *Harper's Magazine*, to which he contributed until his death. The first book by which he attained prominence was *My Summer in a Garden*, a volume of sketches, which was followed by *Backlog Studies, Being a Boy* and *As We Were Saying*. Among his other works are *The Gilded Age*, a drama in which he collaborated with Samuel L. Clemens, and *A Little Journey in the World*, a novel with a moral purpose. He edited the "American Men of Letters" series and *A Library of the World's Best Literature*.

WARNER, SETH (1743-1784), an American soldier, one of the leaders of the Green Mountain Boys, who opposed New York's claim to the New Hampshire grants. He was elected lieutenant-colonel of the Green Mountain Boys in 1775, and the following year was appointed colonel of the continental regiment. He received a colonel's commission for the part he took in the capture of Crown Point. He was in command at the Battle of Hubbardton and rendered efficient service in the Battle of Bennington. In 1782 he retired on account of ill health.

WAR OF 1812, the name given to the struggle between the United States and Great Britain in the years 1812-1814. The general cause of the war was the attitude of Great Britain in relation to American shipping. Its claims to the right to board and search American vessels for the purpose of impressing British citizens, found in their crews, into the British service, its decrees and orders to the detriment of American commerce, its disregard of American protests, which had been a cause for grievance to the Americans for many years, at last compelled them to attempt to secure reparation by force. The same haughty actions regarding American commerce had been taken by France, and it was long a question as to which of the

two powers the United States would fight first, but the proximity of Canada, which seemed to offer an attractive field for conquest, and the old ill-feeling toward England, resulting from the Revolution, finally caused the declaration of war against Great Britain, on June 18, 1812. Five days later the British government withdrew the "Orders in Council," which had been probably the most objectionable features of the British policy, since they established a paper blockade of European ports and practically excluded American commerce from the seas.

At the outset the land forces of the United States made little headway. Great Britain, with her vastly superior resources, was prepared for war, having been at war with France for many years, while the United States government had shown a shameful lack of appreciation of the dangers attending the new republic and had allowed the navy and war departments to deteriorate almost out of existence. The first military movement was that of General Hull, who invaded Canada with two thousand men, but soon retreated before an inferior force under General Brock and surrendered at Detroit, August 16. In October of

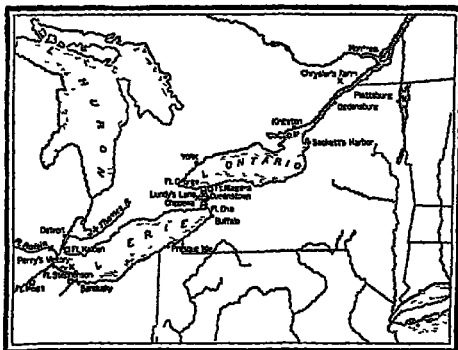
the same year, General Van Rensselaer made another invasion of Canada near Niagara Falls, and after the Battle of Queenstown, in which the British general, Brock, was mortally wounded, the Americans were again driven back with great loss. Meantime, on the sea the United States vessels had some success. The *Constitution* had captured the British frigate *Guerriere* (August 19). The *Wasp*, after a sharp battle, took the *Frolic*. The United States captured the *Macedonian*, and in December the *Constitution* compelled the surrender of the frigate *Java*.

Of the American navy it can be said that at the beginning of the war there were practically no war vessels owned by the government. So badly in need of a naval arm was the country that privateers (which see) were licensed. A few naval vessels were assembled, these in 1812 and 1813 gave so good an account of themselves in action that the

naval history of the war was remarkable. American valor on the sea made forever memorable such names as the *Constitution* ("Old Ironsides"), the *Wasp* and others scarcely less notable.

In the spring of 1813 General Dearborn, who had been placed at the head of affairs in the Northwest, invaded Canada for the third time, with an army of 1,700 men, and captured York (Toronto). He was relieved by Generals Wilkinson and Hampton, who made an attempt to take Montreal, but without success. In May an advance of the British into New York State was repulsed at Sackett's Harbor, and in September Commodore Perry fought the famous Battle of Lake Erie, by which he captured the most important British fleet upon the Great Lakes. This victory enabled General Harrison to invade Canada. There he defeated General Proctor, in the Battle of the Thames.

In 1814 General Jacob Brown again invaded Canada, captured the British Fort Erie and defeated the forces under General Riall at Chippewa. Then followed the Battle of Lundy's Lane and the withdrawal of the Americans to Fort Erie, where they were



MAP OF MAIN OPERATIONS

besieged. In the following September, General Provost led 14,000 men in an invasion of New York, by way of Lake Champlain. The fleet which he had got together was defeated near Plattsburg by an American fleet under Commodore McDonough, while the land force was also repulsed. At about the same time, the British fleet ascended Chesapeake Bay, defeated the hastily sum-

moned American militia at Bladensburg, entered Washington and sacked the government buildings, in retaliation for the sack of York at its capture.

Meanwhile, General Andrew Jackson had been fighting the Creek Indians in the extreme South and had gathered together an army of Kentucky and Tennessee frontiersmen. In January, 1815 this force was confronted by an army sent direct from England, under General Pakenham, and consisting of the veterans of Wellington's campaign against Napoleon. The result was the famous Battle of New Orleans.

On the sea the Americans continued to gain the upper hand, though the *Chesapeake* was captured by the *Shannon*, and other small American vessels were taken. Probably the most memorable event upon the sea during this period was the famous cruise of the American frigate *Essex*, which, after a long and brilliant career against British merchantmen, was compelled to surrender to the *Phoebe* and the *Cherub* in the Pacific Ocean, March 28, 1814. The very month in which the treaty of peace was signed, December, 1814, the Federalists of New England declared their opposition to the war. The Treaty of Ghent provided for the restoration of all lands captured by either side and for a commission to determine the boundary between the United States and Canada. It did not provide for the withdrawal of the British claims regarding right of search, the paper blockade and the laws of neutrality. These practices had already been discontinued by the British, on demand of their own merchants, and were never revived.

Related Articles. Consult the following titles for additional information:

Blockade	New Orleans, Battle of
Brook, Sir Isaac	of
Champlain, Lake	Perry, Oliver H.
Constitution (ship)	Queenston Heights,
Continental System	Battle of
Embargo	Raisin River, Massacre of
Erie, Lake, Battle of	Star-Spangled Banner
Ghent, Treaty of	Thames River, Battle of
Hartford Convention	Tippecanoe, Battle of
Hull, William	United States (history)
Jackson, Andrew	
Lawrence, James	
Lundy's Lane, Battle of	
Millan Decree	

WARRANT, a writ issued by any qualified court officer directing a constable or sheriff to arrest the person named therein and bring him before the official issuing the warrant. A warrant is usually issued upon the oath of a complaining witness as to the guilt of the person concerned. Ar-

rests without a warrant are illegal, except in time of public danger, or when an overt act is witnessed by a peace officer.

WARREN, JOSEPH (1741-1775), an American patriot, born at Roxbury, Mass. He was graduated from Harvard College and became a physician at Boston and a leading figure in Massachusetts political movements, contributing with voice and pen to the cause of patriotism. He drew up the "Suffolk resolves," the most radical expression of the American position with respect to British oppression, and in the following year, 1775, was elected president of the provincial congress of Massachusetts. Although the rank of major-general of Massachusetts forces had been conferred on him, and he was offered chief command at Bunker Hill, he took his place as a volunteer and was killed in the fight of June 17. A monument in his memory erected in 1794, on the spot where he fell, was later replaced by the Bunker Hill Monument (which see).

WARREN, OHIO, the county seat of Trumbull County, fifty-two miles southeast of Cleveland, on the Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is said to be the second city in the United States in the manufacture of electric lamps. Other manufactures are refrigerators, enamel ware, steel, road building machinery, electric motors, steel ranges, shovels, bath tubs, and boilers. It has a federal building, a public library and a hospital. The town was first settled in 1802 and was incorporated in 1834. Population, 1920, 27,050, in 1930, 41,062. There is an airport.

WARREN, PA., the county seat of Warren County, sixty-six miles southeast of Erie, on the Allegheny River and on the Pennsylvania and the New York Central railroads. The city has Warren Conservatory of Music, a business college, a public library, and six parks. There are boiler and machine shops and furniture factories, and oil is refined. The state hospital for the insane is here. Warren was settled in 1780, and was incorporated as a borough in 1832. Population, 1920, 14,272, in 1930, 14,863.

WARSAW, POLAND, capital and largest city of the republic, is situated on the left bank of the Vistula, 625 miles south of Petrograd and 320 miles east of Berlin. The city is built upon a hill, which slopes toward the river, and is connected with its suburb, Praga, by an iron bridge. The old

part of the town is characterized by narrow winding streets and quaint buildings, erected during the Middle Ages. It is enclosed by a wall, which is entered through a number of gates. Around this part of the town are the suburbs, which are of a more modern structure. In Castle Square stands the castle of the old Polish kings. The Roman Catholic Cathedral of Saint Johns, dating from the thirteenth century; the Church of the Holy Virgin, dating from the fifteenth century, and the Church of Saint Anne, of about the same date, are also of interest. The city contains a number of public monuments, among them an obelisk erected to the memory of the Polish generals who fell in 1830. The educational institutions include a university, an observatory, a polytechnic institute, a conservatory of music and a museum of fine arts.

Warsaw is an important industrial center, and its leading manufactures include machinery, chemicals, food products, matches, spirits, tobacco, and boots and shoes. The city itself is not fortified, but protecting it are some of the greatest fortresses in the world. These, with the city itself, were taken by the Germans in 1915 during the World War. After the liberation of Poland at the close of the war, Warsaw became the capital of the newly-organized republic (see POLAND, WORLD WAR). Population, 1931, 1,178,211.

WARSHIP. See NAVY, SUBMARINE; TORPEDO BOAT.

WART, an excrescence of the skin caused by hardening of the papillae. Warts are usually the result of some form of irritation, and appear most commonly on the hands of children. They may disappear after a time, or may persist through life. There have been many superstitious beliefs as to methods of removing warts, but the only reliable way is that of having them cauterized by a physician, or treated with lactic acid or a similar chemical. Senile warts result from a breaking down of the skin, favored by irritation or lack of cleanliness, and are usually found on the back, neck and arms.

WART HOG, a wild pig, native to Africa. It stands about three feet high, having rather long legs. The face is rendered extremely hideous by large tusks and wart-like protuberances under the eyes and at each side of the huge snout. The coarse hair, short on the rest of the body, is long on the

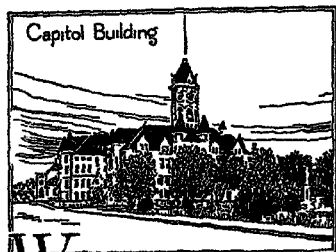
back and hangs in a mane on the neck. These hogs roam in small groups in search of food, and are destructive to crops. There are two principal species, one in Abyssinia and Somaliland, and the other in South Africa.

WARWICK, RICHARD NEWELL, Earl of, called the "king-maker" (1428-1471), an English soldier and statesman. He was the son of the Earl of Salisbury and became Earl of Warwick after marrying the heiress of the Warwick titles and estates. Taking the Yorkist side in the Wars of the Roses, he was the main instrument in placing Edward IV on the throne in 1461, in place of Henry VI, and he became the most powerful nobleman in the kingdom. He quarreled with Edward, however, on account of the latter's marriage, went over to Henry's side and was able to place him again on the throne, but was defeated and slain at the Battle of Barnet.

WASATCH, *war'satch*, MOUNTAINS, a range belonging to the Rocky Mountain system. It extends from Southeastern Idaho to Southwestern Utah, forming the eastern boundary of the Great Basin in which lies the Great Salt Lake. The mountains rise abruptly from the plain and reach an average height of 10,000 feet. The highest peak, Mount Belknap, reaches 12,000 feet above sea level. The peaks, covered with perpetual snow, are the source of numerous streams, and the region is broken by canyons.

WASHBURN COLLEGE, a Congregational institution of higher learning, established in 1865 at Topeka, Kansas. There is a school of liberal arts and instruction is also given in engineering and law. There is also a preparatory school. The attendance is over 1,100; faculty, 75; library, 40,000 volumes.

WASHING MACHINE, a mechanism of varied types and sizes for washing clothes, fabrics, etc., in the home and public laundries. The clothes are placed in a water-proof metal cylinder and agitated by an inner device containing cleansing solutions. The direction of rotation is reversed automatically every few revolutions, thus displacing dirt by forcing soap and water through the clothes. Most machines are electrically equipped. Many have roller attachments for wringing and mangling. All have safety features, the moving parts being covered to avoid accidental catching of clothes. Another feature is an automatic timer to turn off current when washing has continued the desired time.



WASHINGTON, a prosperous and progressive state of the American Union, situated in the extreme northwestern part of the country, south of the International boundary and on the Pacific coast. Its popular name, the Evergreen State, refers to its wealth of fir forests. About seventy per cent of the surface is forest-covered, and in the annual production of lumber Washington is the leading state in the Union. The rhododendron is its flower emblem.

Location and Area. The state is bounded on the north by the Canadian province of British Columbia, the forty-ninth parallel forming the line between the two divisions. Extending into the northwestern part of the state is the irregular, much-branching inlet, Puget Sound, which is connected with the open ocean by the straits of Juan de Fuca and Georgia. Between these straits lies the island of Vancouver, which is wholly Canadian territory, though it extends south of the international boundary. Washington touches the northern extension of Idaho on the east, and along most of its southern border it is separated from Oregon by the Columbia River.

With an area of 69,127 square miles, of which 2,291 square miles are water, the state is the nineteenth in size, having but 293 square miles less than the state of Missouri. Washington is about two-thirds the size of Oregon, its southern neighbor, and if placed on the province to the north, would occupy less than one-fifth of that area.

People and Cities. In 1920 the population was 1,356,621. By the Federal census of 1930, it had grown to 1,563,396, with an average density of 23.4 persons to the square mile, ranking it thirtieth in population.

Of the foreign-born groups, who number in all about 244,000, the most prominent numerically are Canadians, Swedes, Ger-

mans, English and Irish. The state has twelve Indian reservations, with a total population of about 11,000. There are also large numbers of Japanese, Chinese and Negroes. Negroes numbered 6,840, Japanese, 17,800, and Chinese, 2,200, in 1930.

The largest religious bodies are the Roman Catholic, Methodist, Presbyterian, Lutheran, Baptist and Congregationalist denominations.

According to the Federal census for 1930, Washington has fifteen municipalities with populations exceeding 10,000. There are three large cities—Seattle (365,583), Spokane (115,514) and Tacoma (108,517). Other important cities are Everett, Bellingham, Walla Walla and Olympia, the capital.

Surface and Drainage. The Cascade Mountains cross the state from north to south about 120 miles east of the coast, and divide it into two unequal parts, Eastern Washington and Western Washington. These mountains form the chief physiographic features of the state and have a mean elevation of about 8,000 feet. Their eastern slope rises gradually from the interior plateau, but the western slope is steep and broken. The range contains a number of lofty peaks whose summits are covered with perpetual snow. The most noted among these are Mount Rainier, 14,408 feet, now enclosed in a national park, Mount Adams, 12,307 feet, Mount Baker, 10,730 feet and Mount Saint Helens, 9,671 feet. Eastern Washington, which includes nearly two-thirds of the state, contains the Columbia River Basin, which is by far the largest natural division of surface within the state. Within this basin are the great irrigated and grain-growing districts and a number of fertile valleys famous for fruit products. In the southeastern part the Blue Mountains rise to an altitude of about 6,000 feet.

Western Washington is naturally divided into three physiographic regions—the Puget Sound Basin, including the territory between the Olympic and Cascade mountains, and surrounding the great inland sea, Puget Sound; the Olympic Peninsula, including that portion of the state containing the Olympic Mountains and the region extending from them to the Pacific, and the southwestern division, which occupies the region fronting on the Columbia River and Pacific Ocean and extending northward until it meets the Olympic Peninsula. The Olympic

Mountains are the northern extension of the Coast Range

The eastern section of the state, or Eastern Washington, is drained entirely by the Columbia River and its tributaries. This river enters the state near the northeastern corner and flows south by west then westward in an irregular course, then southward and southeastward until it reaches the southern boundary, when it makes a sharp turn to the west and pursues its course to the Pacific. These changes in direction form what is known as the Great Bend in the Columbia River, and this is for a part of the way the western boundary of the plateau. The chief tributaries of the Columbia are Clark Fork, from Idaho, the Snake, which flows through the southeastern corner of the state, the Spokane, the Okanogan, the Methow, the Wenatchee and the Yakima. Western Washington is drained into Puget Sound and the Pacific. In this section all of the rivers are short and comparatively unimportant, the most important being the Cowlitz, flowing southward into the Columbia, the Chehalis, flowing directly into the Pacific, and the Skagit, which enters Puget Sound. The state contains a number of mountain lakes, the largest being Lake Chelan.

Climate. The Cascade Mountains divide the state into two climatic regions. Eastern Washington is characterized by hot summers, cold though not severe winters and light rain-falls, the annual average being about sixteen inches. In many sections irrigation is necessary to successful agriculture. Except upon the high altitudes there are many hot days during the summer. During the winter there are heavy falls of snow, which are welcomed by the farmers, because as the snow on the lowlands melts, it is absorbed by the soil, and that upon the mountains during the summer feeds the streams which supply water for irrigation. The climate of Western Washington is mild and moist. The prevailing westerlies, blowing moisture-laden from the sea, strike the cool slopes of the mountains and have their moisture condensed. West of the Cascades the annual rainfall varies from twenty to 132 inches. The winters are mild and the summers are free from extreme heat.

Mineral Resources. There are extensive deposits of coal in the Puget Sound Basin, notably in King, Pierce, Lewis, Whatcom and Thurston counties, also in Kittitas county, east of the Cascade Range. About 1,625,000

tons of coal are mined annually. Both bituminous and lignite varieties are found. The coal deposits of Washington are the only ones of any great extent on the Pacific coast.

Veins of ore producing gold, silver, copper, lead, quicksilver and a number of rare metals occur throughout the mountainous regions. Gold and silver are mined in Whatcom, Skagit, Snohomish, King, Pierce, Lewis, Skamania, Cowlitz, Okanogan, Chelan, Kittitas, Yakima, Kliekutat, Ferry and Stevens counties. Iron ore, and marble, granite, onyx, serpentine, limestone and sandstone occur in large quantities. Beds of fire clay, kaolin, talc and asbestos are among the valuable resources of the state. The value of the total annual output is about \$12,000,000.

Fisheries. The waters of Puget Sound, the Columbia River and the indentations along the Pacific coast abound in excellent food-fish, and in the lakes and streams are found large quantities of fresh-water fish. The most important branch of the fisheries is catching and curing salmon (see SALMON). Second in point of value are the halibut fisheries. Large quantities of oysters, shrimps, clams and cod are also taken. In value of products of the fisheries Washington ranks fourth among the states.

Agriculture. Washington has a wide variety of soils. On the uplands of Eastern Washington wheat and other cereals are raised in large quantities. In the diked lands along Puget Sound oats are raised, and in the southeastern part barley constitutes the important crop. Rye, buckwheat and flax are also grown, and in some counties hops are a staple product. Many large irrigated areas east of the mountains are devoted to alfalfa, the state produces nearly 2,000,000 tons of hay annually. Potatoes, beets and other vegetables thrive and yield large returns.

Washington is one of the most important fruit-growing states of the Union. In the valleys of Eastern Washington there are thousands of orchards. This region is especially valuable for the raising of apples, pears, peaches, plums and cherries. In the western part of the state small fruits are raised in large quantities, and grapes are grown upon both sides of the mountains.

The mild winters and excellent pasturage make the raising of live stock profitable, and large numbers of cattle, horses, sheep and hogs are found. For all of these there is a

ready market Dairying is also profitable and can be practiced under ideal conditions.

Manufactures Washington has abundant water power and a vast forest area Because of these conditions, lumbering and its allied industries—the manufacture of doors, sash, shingles and furniture—constitute the leading manufacturing industry Lumber mills are very generally distributed through the forest regions, but the most extensive establishments are found on the shores of Puget Sound, near the large forests of Western Washington

The products of the flour and grist-mills are second in value, the most important commodity of the industry being white flour Slaughtering and meat packing, the canning and curing of fish, printing and publishing and railroad-shop construction and repair are all prosperous lines of activity Seattle, Tacoma and other ports are centers of ship-building Seattle is the chief manufacturing city of the state, with Tacoma, Spokane, Everett, Bellingham, Aberdeen, Walla Walla and Yakima following.

The mineral resources have given rise to various other industries In the Puget Sound Basin large quantities of lime are produced. Granite is quarried in Snohomish and Spokane counties. In other localities valuable sandstone occurs, and onyx of great variety and beauty is quarried in Stevens County In King County are factories for the manufacture of brick, tile, terra cotta, stoneware and sewer pipe The total value of all manufacturing output is over \$400,000,000

Transportation. Puget Sound and the Pacific Ocean have a Washington coast line exceeding 2,000 miles in extent The largest ocean ships can sail on the Sound as far as Seattle and Tacoma, which are the chief harbors of the state Three transcontinental lines of railway cross the state from east to west. Railway lines extend north and south from the great centers of trade on Puget Sound, and connect all important cities and towns in the state and maintain junction points for cities in British Columbia The most important roads are the Northern Pacific, the Oregon & Washington, the Great Northern, the Chicago, Milwaukee, Saint Paul & Pacific, the Pacific Coast Railroad, the Union Pacific and the Southern Pacific The total mileage of the state is about 5,500 There are 18 airports and three major air routes Five bus companies operate on seven principal

routes running both east and west and north and south There are 900 miles of electric railway and 16,870 miles of surfaced roads

Government The legislature consists of a house of representatives, that cannot exceed ninety-nine members or be less than sixty-three, and a senate, whose number cannot exceed one-half, or be less than one-third of the number of representatives The representatives are elected for two years, and the senators are elected for four years The legislature meets biennially, and the regular sessions are limited to sixty days The executive department consists of a governor, a lieutenant-governor, a secretary of state, a treasurer, an auditor, an attorney-general, a superintendent of public instruction, a commissioner of public lands, and an insurance commissioner, elected for four years The courts consist of a supreme court of nine judges, elected for six years, and a superior court in each county, presided over by a judge elected for four years

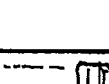
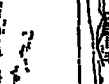
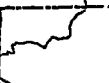
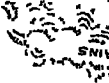
Education. The public schools are under the direction of the superintendent of public instruction and a board of education The schools are organized on the district plan, and each district must maintain a school for at least five months in the year Education is compulsory between the ages of eight and fifteen. The school fund is derived from state and local taxes and from income from the permanent fund derived from the sale and lease of school lands The yearly cost of the public schools is about \$33,000,000 The white population of Washington shows the lowest percentage of illiteracy of any state in the Union. The state university is at Seattle and teachers colleges are maintained at Bellingham, Cheney and Ellensburg The state agricultural college is at Pullman Other colleges are located as follows: at Spokane, Gonzaga University, Whitworth College and Spokane University; the College of Puget Sound at Tacoma; Walla Walla College at College Place, Whitman College at Walla Walla; Seattle Pacific College at Seattle

Other Institutions The schools for the deaf and the blind are at Vancouver The hospitals for the insane are at Fort Steilacoom, Sedro Woolley and Medical Lake, and there is a soldiers' home at Orting and a veterans' home at Port Orchard The penal institutions consist of the penitentiary at Walla Walla and the reformatory at Monroe The state training school is located at Chehalis

WASHINGTON THE EVERGREEN STATE



OCEAN
VESSEL ON
PUGET SOUND



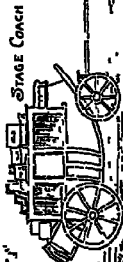
PRODUCTS

FROM THE MINE
GOLD
SILVER
LEAD
COAL
IRON

FROM THE LAGOON
LIMESTONE
APRLES & PEARS

FROM THE SEA
SALMON (FRESH)
HALIBUT
STURGEON
FLOUNDERS
OYSTERS

FROM THE FORESTS
LUMBER (FRESH)
TOBACCO
WHEAT
HOPS
PRUNES
ALFALFA
CORN



Items of Interest on Washington

The assessed valuation of taxable property is over a billion and a quarter dollars

The lumber resources of the state will probably last for one hundred years

The northern boundary of the state was fixed by treaty in 1846 "Fifty-four forty or fight" was a popular slogan in the presidential campaign of 1844, and represented the demands of citizens respecting this boundary

Girls and boys between fifteen and sixteen who are unemployed are compelled to attend school.

Suffrage was granted to women in 1910.

Nearly 20 per cent of the potential hydro-electric power of the nation is credited to Washington

The slopes of the Olympic Mountains have deep gorges and dense forests of fir, and are almost inaccessible

The foreign-born make up 15.6 per cent of the population

In a survey of the states made by the chief statistician of the Federal Office of Education, Washington stood first when measured by a ten-point scale

Questions on Washington

Where are the Cascade Mountains?
Of what is the Columbia Plateau composed?

What is the principal drainage system in the state and which are the important tributaries?

How many acres in the national forest reserves?

How do the fisheries rank among the states of the Union?

What is the value of the annual output of minerals?

What are the leading crops?

What is the principal manufacturing industry?

How does the value of its products compare with that of other states?

Name four other important industries

What will be the most startling sights when you visit Washington?

How does the state rank in matters of education?

History. For early history, see OREGON, subhead *History* The territory of Washington was separated from Oregon in 1833, and soon afterward the discovery of gold led to an influx of settlers, which in turn induced the Indians to plan a massacre, known as the Washington-Oregon War, in 1855 Indian troubles continued to appear from time to time, but the constant increase of white population finally led to the acceptance of reservations by the Indians After the Civil War, there were violent anti-Chinese agitations, which for a time retarded this territory's growth Numerous attempts were made to secure statehood, and in 1889 the Omnibus Statehood Bill, admitting the two Dakotas, Montana and Washington, was signed by the President, and Washington became a state The growth in the population and wealth of Washington since its admission has been uninterrupted The Alaska-Yukon Exposition of 1909 at Seattle admirably celebrated the growth of the state In 1922 the private sale of drugs for narcotic purposes was by law declared a felony In 1932 the Wenatchee hydroelectric dam across the Columbia River was completed

Related Articles. Consult the following titles for additional information

CITIES

Aberdeen	Olympia	Vancouver
Bellingham	Seattle	Walla Walla
Everett	Spokane	Yakima
Hoquiam	Tacoma	

MOUNTAINS AND RIVERS

Cascade Range	Ranier, Mount
Coast Range	Snake River
Columbia River	



WASHINGTON, the capital of the United States of America, named for the first President of the republic, and located on a site chosen by him. It lies on the Potomac River, 156 miles from Chesapeake Bay and 185 miles from the Atlantic Ocean, 135 miles southwest of Philadelphia and 228 miles southwest of New York Chicago is 790 miles northwest, and Atlanta 648 miles southwest Washington is coextensive with the District of Columbia, which covers an area of about seventy square miles The southwestern border is formed by the Potomac River, into which flows Rock Creek.

Anacostia River cuts through the city a mile and a half from the southeastern boundary and flows into the Potomac at the southernmost point of the city

The population was 486,869 in 1930, with about 25 per cent Negroes and 66 per cent foreign born

Plan of the City. Washington was laid out according to suggestions made by President Washington, who employed Pierre Charles L'Enfant, a French civil engineer, to prepare the plans for the proposed city. It is said that L'Enfant rode over the ground with the President and commissioners and grew enthusiastic over the location, deeming it a fit site for the capital of a "mighty empire." Jefferson furnished L'Enfant with plans of the great cities of Europe, but the French engineer, faithful to the inspiration he had received from Versailles, determined to have broad avenues, vistas, streets and parkings, which make Washington truly the "City of Magnificent Distances." The Capitol was located on a hill, which was then a thick wood, the lines of latitude and longitude which marked its center were carefully surveyed, and the streets and avenues were laid from this point with mathematical exactness. It was manifestly the intention that the chief front of the Capitol should be toward the east, and that the public buildings should be placed about that side; but many forces contributed to change this idea, and now the west front, with its great terraces topping the hill and with its magnificent stairways extending far down the side, is worthy to be called the main entrance.

From the middle of the four sides of the site of the Capitol extend four great streets, which separate the city into quarters, known as North West, North East, South West and South East. These four streets are known as North and South Capitol, East Capitol and the Mall. The last is a beautiful park area, which takes the place of a West Capitol street. The streets running parallel to East Capitol and the Mall are named, both north and south, for the letters of the alphabet. The streets parallel to North and South Capitol are numbered consecutively east and west. Broad avenues, named for the states, traverse the city from northwest to southeast and from northeast to southwest. All of this will be clearly understood if the reader will study the accompanying map. In locating any place it is necessary, of course, to mention the quar-

ter of the city. When this is done, the location is very definite, for instance, 1850 F Street N. W., would be known to lie between Eighteenth and Nineteenth streets on F Street, in the northwestern part of the city. In the addressing of mail to the North West section, it is customary to omit the letters N. W., but those for the other three sections should always be written.

The North West quarter of the city contains most of the business houses, the finest residence section and most of the government buildings. Pennsylvania Avenue extends northwest from the Capitol for about a mile to the Treasury building, there it bends sharply to the north and again to the west, here passing in front of the Executive Mansion and the State, War and Navy building, beyond that it turns again to the northwest. F, G, Seventh and Ninth streets North West are among the important business streets.

Washington is connected with all of the states by the Baltimore & Ohio, the Pennsylvania, the Chesapeake & Ohio, the Southern and other railroads. All trains enter the magnificent Union Station north of the Capitol. Seven principal bus and two air lines serve the city. The Washington-Hoover is a private airport, Bolling Field belongs to the army, the navy maintains the Naval Air Station. Electric railways and motor buses afford easy transportation throughout the city and to Mount Vernon, Arlington and other points of interest.

Parks and Boulevards. The park surrounding the Capitol occupies sixteen city blocks, crowning a hill 58 feet high, overlooking the west half of the city. It is laid out with drives and walks, bordered by magnificent trees and beautiful shrubbery, interspersed with beds, in which blossom the flowers of the season. The small ornamental buildings, fountains and statuary lend a peculiar charm to the whole park.

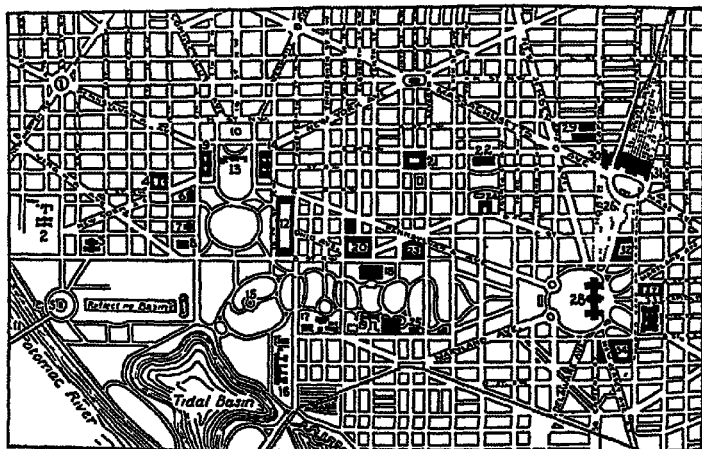
From the west front of the Capitol a person looks down upon the broad Mall, which extends about a mile to the imposing Washington Monument, and then on to the Lincoln Memorial. In the Mall trees, shrubs and plants beautify the walks and drives. Along the north side of the Mall are grouped the great series of Federal buildings in the "triangle" area bounded by Pennsylvania and Constitution avenues on the north and south and by Fifteenth Street on the west. Running north from the west end of the Mall are the

Executive grounds, a magnificent tract which, with the private gardens of the White House, cover about twenty city squares. North of the White House and across Pennsylvania Avenue is Lafayette Square, another fine park adorned with fine statuary.

The intersections of the avenues and streets throughout the city form squares and circles

city filtration plant. In the spring, when the foliage is fresh and the flowers in the parks are in full bloom no more beautiful city is to be found

A survey of the statues and memorials distributed over the city is both an extensive and a very instructive undertaking. Special mention should be made of the statues of George



MAP AND KEY OF WASHINGTON, D C

- | | | |
|--------------------------------|--------------------------------------|-------------------------------|
| 1 Washington Circle | 12 Department of Commerce | 23 Archives Building |
| 2 U S Naval Hospital. | 13 The White House | 24 Court House |
| 3 National Academy of Sciences | 14 Treasury Building | 25 Army Medical Museum |
| 4 Interior Department. | 15 Washington Monument. | 26 Capitol Park. |
| 5 Lincoln Memorial | 16 Bureau of Engraving and Printing. | 27 U S Supreme Court. |
| 6 Corcoran Art Gallery. | 17 Department of Agriculture. | 28 The Capitol |
| 7 Continental Hall | 18 National Museum | 29 Government Printing Office |
| 8 Pan-American Union | 19 Smithsonian Institution. | 30 Post Office |
| 9 State, War and Navy Building | 20 Internal Revenue. | 31 Union Station |
| 10 Lafayette Square | 21 Patent Office. | 32 Senate Office Building |
| 11. Memorial Arlington Bridge | 22 Pension Office. | 33 Library of Congress |
| | | 34 House Office Building. |

which are public gardens filled with statuary, flowers and shrubs. Out beyond Rock Creek is the great National Zoological Park, which in time will become one of the greatest in the world. North and south of this extends Rock Creek Park, a tract which is preserved in all its natural beauty.

Along the river is Potomac Park, a tract of 737 acres, adjacent to the west end of the Mall, made up of reclaimed land. The Soldiers' Home four miles north of the Capitol is in a beautiful park of 500 acres. To the south of it is McMillan Park, containing a

Washington, and statues of Andrew Jackson, Abraham Lincoln, Winfield S. Scott, John A. Rawlins, James B. McPherson, George H. Thomas, Joseph H. Henry, David S. Farragut and John Marshall. There are many others.

The memorials include the Emancipation Group, the Adams Memorial, Samuel Gompers and American Federation of Labor Memorial, among many others of equal or greater distinction.

Public Buildings and Institutions. Chief of all the public buildings is the Capitol

which because of its towering dome is conspicuous from any direction in which one approaches the city. The original plans for the Capitol were drawn by Doctor Thornton, a native of the West Indies, but they were redrawn by Stephen H. Hallet, they were followed in the construction of the first building, which little resembled the Capitol of to-day. The north wing was finished in 1800, but the opposite wing was not ready until eleven years later. A wooden passageway then connected them. After the British burned the Capitol in 1814, the new central structure was planned, and the original building was completed in 1827, at a cost of not quite \$2,500,000. In 1851 the building was remodeled, and in 1856 the erection of the present iron dome was begun.

The Capitol as it now stands, together with its approaches, has cost about \$26,000,000. The building is 751 feet long and 350 feet in its greatest width, and it covers nearly four acres of ground. Within this imposing building are the two chambers occupied by the Senate and the House of Representatives, and apartments for the various committees and officials who meet at the Capitol, and other rooms, made necessary by the great amount of business transacted there. The rotunda, the marble stairways and the dome are decorated with choice statuary and paintings by famous American artists. Most of the paintings depict great events in the nation's history. The famous doors, designed by Randolph Rogers, which guard the east entrance, are ornamented in high relief with historic scenes from the life of Columbus. The old Hall of Representatives is now called Statuary Hall. See STATUARY HALL.

To the north, and in a space adjoining the Capitol grounds, is a massive granite building, in which are located offices for the Senators, and to the south are two other buildings of white marble, which contain offices for the members of the House of Representatives. These great structures constitute a notable contribution to the splendid group of buildings which crown Capitol Hill.

Along the Mall are the buildings of the Fish Commission, the Medical Museum, the great National Museum, the Smithsonian Institution, the Agricultural Department and the Bureau of Engraving and Printing. The buildings on the north side of the Mall include those of the Commerce Department, the Interstate Commerce Commission, the

Post Office Department, Internal Revenue and others. East of the White House is the low, massive Treasury Department building, while west of it rises the magnificent building of the State, War and Navy Departments. The government Printing Office, the Pension Office and the Interior Department are in different localities of the North West quarter. Near the Capitol, and east of it, is the Library of Congress (See LIBRARY OF CONGRESS). The new Supreme Court building faces the Capitol on the east.

The Lincoln Memorial (1922), an imposing marble temple with Doric columns, is situated on the bank of the Potomac at the west end of the Mall, within is the colossal statue of Lincoln by Daniel Chester French. At this point the beautiful Memorial Bridge reaches across the Potomac to Arlington Cemetery.

The Navy Yard, the Arsenal and the War College occupy sites on the river at the south side of the city. Other buildings widely famous are the Corcoran Art Gallery, the Pan-American Union building, the Scottish Rite Temple, the Freer Gallery of Art, the National Academy of Sciences, the United States Chamber of Commerce building and the home of the National Geographic Society.

The Municipal Center is at John Marshall Place, north of Pennsylvania Avenue. The old Supreme Court building is the center of the group which includes accommodations for the municipal court, the police court, the recorder of deeds, the administration office of the District, offices of the public library and the Board of Education. The new buildings are limited to six stories in height.

Religious denominations have done their share in adding distinction to the city. Among famous church buildings is the Protestant Episcopal Cathedral of Saint Peter and Saint Paul. The project resulting in this magnificent structure was begun in 1891. It will be completed as funds are provided but is now so far advanced as to be a national shrine. It is situated on Mt. Saint Albans on a plot of 67 acres. The ground floor will accommodate 27,000 persons standing. It is built chiefly on Indiana limestone. Several institutions are housed in this edifice.

In the National Shrine of the Immaculate Conception, the dome is a distinctive architectural feature, there is also a triple apse with each part divided into five chapels. The Methodist Episcopal Church South, near Mount Vernon Square, cost \$500,000. The

Baptist Memorial Church represents both the Northern and the Southern Baptists. President Lincoln worshipped at the famous New York Avenue Presbyterian Church.

The colored people own many churches, including the famous Asbury Memorial.

Government of the CAPITAL CITY. The city boundary is that of the District of Columbia. Congress governs the District through a commission appointed by the President. Government influences dominate all of the city's interests.

Residents in the District of Columbia even though citizens of the United States have no right of suffrage. It is left to voluntary organizations to consolidate public opinion in any effort to influence Congress in respect to civic affairs.

Educational Institutions. This is a great educational center. The public schools are excellent, the system was founded by a board of trustees of which Thomas Jefferson was the first president. Among the higher institutions of learning are Georgetown University, George Washington University, Catholic University of America, American University, National University, and Howard University for Negroes. More than 150 high grade private boarding schools and special schools give undergraduate instruction.

Supplementing the universities are the great scientific bureaus and institutions for research maintained by the government. These deal with problems of labor, education, fisheries, geological survey, health, scientific standards, forest conservation, weather and soil fertility. In fact there is scarcely a scientific area that is not investigated by government officials. There are 200 specialized libraries, some of them having large collections of valuable books.

The Smithsonian Institution, founded by James Smithson, an Englishman, who gave half a million dollars for its establishment, and the more recent Carnegie Institution, with an endowment of \$10,000,000, are the leading private foundations for the advancement of knowledge.

History. Washington enjoys the distinction of having been designed and built for the capital of a great nation. Rome, London, Paris and Berlin grew out of the national conditions surrounding them and became the capitals of great empires, but the capital of the United States was located in a region sparsely populated and almost wholly wild,

it was built from plans that were created before any city was in existence there. The site was selected by the great President whose name was given the city, and he watched over its early days with a personal care and interest.

Congress held its first session in the Capitol in 1800. The city grew until 1814, when, after a weak resistance by American troops at Bladensburg, it was captured by the British, who set fire to the public buildings and some private residences, with the expectation of destroying the entire city. A storm put out the conflagration, and the next day the British, in a panic of unnecessary fear, retreated, leaving Washington to be immediately rebuilt. At the breaking out of the Civil War it contained about 61,000 inhabitants. Beginning about 1900, following plans and designs by eminent architects and artists, vast improvements have been made in the appearance of the buildings erected by the Federal Government, especially in the section between the Capitol and the White House.

Related Articles	Consult the following
titles for additional	information
Corcoran Art Gallery	National Museum
District of Columbia	Potomac River
Library of Congress	Smithsonian
Washington	Institution
Monument	White House
Mount Vernon	

WASHINGTON, BOOKER T. WASHINGTON (about 1858-1915), an American negro educator. Freed from slavery by the Civil War, he began work in a salt furnace in West Virginia, attended a night school and obtained the rudiments of an education. He then went to Hampton Normal and Agricultural Institute, where he remained three years. After this he took a complete course at Wayland Seminary in Washington, D. C., and then became an instructor at Hampton, in charge of the work of the Indian pupils and of the night school.

His success was phenomenal, and in 1881 he was selected by General Armstrong, principal of the institute, to start a normal school at Tuskegee, Ala. He began his work in an old building, with thirty pupils, but in the course of the year purchased the plantation where the Tuskegee Normal and Industrial Institute is now located. Under his management this school developed into the largest and most influential industrial school for colored people in the world (see **TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE**).

He wrote *The Future of the American Negro, Up from Slavery* (his autobiography), *Character Building, The Story of My Life* and *Working with the Hands*



WASHINGTON, GEORGE (1732-1799), an American soldier and statesman, the hero of American independence, and the first President of the nation which he helped to establish. There are two Americans of the generations now past who have won the undying love and reverence of their countrymen—Washington and Lincoln. Though they are equally

honored, the one as founder and the other as preserver of the American nation, they are thought of as totally different types. Lincoln, so much nearer our own time, is by far the more human figure. His humanity, his rugged appearance, his humor and his kindness are remembered as the characteristics of a very real man. Washington is more or less of a mythical personage. The idealized portrait painted by Charles Stuart, reproduced here with in full page is in a way symbolic of the impression that Americans cherish of the "Father of His Country." He seems to them a lofty figure somewhat detached from everyday life, a great man, but one aloof from his fellowmen; a strong man, but without fire and vigor. The complete record of his life refutes these ideas. There is every reason to believe that if he were alive to-day he would be a virile and influential figure in American political affairs, a personality as vivid as in his own time.

Ancestry and Youth The family of the first President came of a line of well-born Englishmen. They were the Washingtons of Sulgrave Manor, in Northamptonshire, who traced their ancestry to a Norman knight of the twelfth century. About the year 1657 John and Lawrence Washington, brothers, emigrated to America, and shortly afterwards purchased estates in Westmoreland County, Virginia. The eldest son of John was Lawrence Washington, the grandfather of the future President. His second son, Augustine, married Mary Ball as his second wife, and the first child of this marriage, George, was born on February 22, 1732, at Bridges Creek,

now Wakefield, in Westmoreland County. When George was three years old his parents removed to an estate on the Rappahannock River, in Stafford County, and there the boy's first school days were spent. He went to his classes in an old-fashioned school house where the sexton of the parish acted as teacher.

At the age of eleven George lost his father, and his widowed mother sent him to the old homestead at Bridges Creek to live with his half brother, Augustine. There he attended school until he was nearly sixteen, geometry and surveying being included in his studies. While he was not an apt classical student, he made excellent progress in surveying, and throughout this school period he cultivated robust health by outdoor exercise, such as horseback riding and athletic games. It was when he was thirteen that he wrote the rules of good behavior now so well known.

Soon after he left school George went to live with his eldest half brother, Lawrence, who was occupying that portion of the estate known as Mount Vernon. Lawrence Washington had married the daughter of William Fairfax, who was the manager of the great estate of his cousin, Lord Fairfax, the head of the family. Lord Fairfax conceived a great liking for young Washington, and presently entrusted to him the task of marking out the boundaries of the Fairfax estate. George began his duties in 1748, when he was but a few days past sixteen, and for many months he endured the hardships of a surveyor in the wilderness. His work was so well done that he was subsequently appointed public surveyor of Culpeper County, and his surveys were considered admirable examples of thoroughness and accuracy.

In 1751 George accompanied his brother Lawrence on a trip to the West Indies. The journey was undertaken in the hope of restoring the elder brother's health, undermined by service in the British navy. In 1752, a few months after the brothers returned to Virginia, Lawrence died, and George found himself the guardian of his niece and one of the executors of the estate. The death of this niece a few years later made him master of the mansion and the beautiful grounds about it—the Mount Vernon that is to-day a sacred place to all loyal Americans.

Early Military Career. Not long before he died Lawrence Washington had used his influence to have his brother appointed an

adjutant-general over one of the several military districts into which Virginia colony was divided. This division was rendered necessary by the threatened encroachments of the Indians and of the French, who were establishing posts along the Ohio. Washington's eager pursuit of the study of military tactics was interrupted by the trip to the West Indies, but he resumed his duties as adjutant-general after his return, and late in 1753 was requested by Governor Dinwiddie to carry a message of warning to the French forces in the Ohio Valley. It was a hazardous mission for a young man of twenty-one, and the selection reflects favorably upon Washington's reputation for reliability and good judgment. In November, accompanied by an experienced frontiersman, he started on his 600-mile journey. After many narrow escapes from the Indians and the perils of the wilderness, he completed his mission and reported to Governor Dinwiddie on January 16, 1754, at Williamsburg, the capital of Virginia. Shortly afterwards he was appointed lieutenant-colonel of the Virginia regiment.

A skirmish with the French in the summer of 1754, which was not decisive, was followed by a reorganization of the Virginia troops and Washington's temporary retirement from things military. Early in 1755, however, General Braddock arrived from England with two regiments of British regulars, and offered the young colonial a place on his staff, with the rank of colonel. Promptly accepting, Washington entered eagerly into the preparation of the campaign, and on July 9 took part in the disastrous fight at Fort Duquesne. How the English regulars were mowed down by bullets fired from behind trees, and how the Virginians under Washington saved the little army from annihilation by fighting under cover, as did the French and Indians, is known to every American school boy. The troops succeeded in withdrawing from the field, but Braddock was fatally wounded, and died four days later. Washington later reorganized the colonial troops and was their chief commander until 1758, when he retired to Mount Vernon to rest. It was with great satisfaction, however, that, in November, 1758, he accompanied the British forces to the smoking ruins of Fort Duquesne, which was renamed Fort Pitt in honor of England's great Prime Minister.

At Mount Vernon. The period between the close of the French and Indian War and the outbreak of the Revolution brought to Washington some of the happiest years of his life. In January, 1759, he married Mrs. Martha Custis, an attractive and wealthy young widow with two children, John and Martha Parke Custis. The management of his own and his wife's property provided an outlet for his business instincts, and he entered whole-heartedly into the public affairs of Virginia colony as a delegate to the House of Burgesses, to which he had been elected before his marriage. These duties, with those of a good churchman and a hospitable colonial gentleman, rounded out a life completely wholesome and happy. The Mount Vernon mansion was always filled to overflowing during the hunting season, but none of its inmates enjoyed the pleasures of the chase more than the master himself.

As relations grew strained between the colonies and the mother country, Washington for a long time hoped that an agreement might be reached without resort to war, and he was very guarded in his utterances. In 1760, however, he drew up a nonimportation agreement which was adopted by the House of Burgesses, and from that time on he refused to permit any of the banned articles to be brought into his house.

As a member of the provincial convention, held in August, 1774, at Williamsburg, he vigorously upheld the right of the colonies to govern themselves, and, moved by reports about the effects of the Boston Port Bill, exclaimed in an impassioned speech, "I will raise a thousand men and march with them, at their head, for the relief of Boston." Virginia sent him as one of its six delegates to the First Continental Congress, and in this and the succeeding Congress, held in 1775, he was clearly one of the commanding figures, though he let others make the speeches.

The Revolutionary War. On June 15, 1775, two months after the Battle of Lexington, Washington was unanimously chosen by Congress to be commander in chief of the Continental forces. Addressing the assembly the following day, he modestly accepted the honor, and assured the delegates that he would expect no remuneration except for his own expenses. He then departed on horseback for Boston, and on July 3, 1775, took command of the Continental army, in Cambridge. The old elm under which this ceremony



GEORGE WASHINGTON

The unfinished portrait by Gilbert Stuart in the Athenaeum, Boston



MOUNT VERNON

It was Washington's great joy to return to Mount Vernon when the demands of his country permitted. He was a home-loving body. Here on his beautiful estate he "grew stronger, abler, and wiser in the happy years of rest and waiting which intervened" between his great periods of service.



WASHINGTON'S TOMB

mony took place is still preserved as a cherished relic

The military events of the long struggle which the colonies waged for independence are told in these volumes in the article on the Revolutionary War. The personal share of Washington in the hard-won victory cannot be overestimated, from the perspective of a century and a half it seems almost incredible that he did succeed. Difficulties beset him that would have broken the courage of a weaker man. His little army of barely 14,000 was lacking in arms, supplies, discipline and organization. There was no uniform policy among the colonies on any matters essential to the prosecution of the war, and authority was vested in too many officials and organizations to bring about any semblance of unity. There were bickerings, quarrels and plots. Yet, somehow, Washington overrode all obstacles. For one thing, he was loved and trusted by his men, and because of that trust they endured terrible hardships to uphold him.

When the army went into winter quarters at Valley Forge, in December, 1777, Washington informed Congress that he had 2,898 men unfit for duty because they were "barefooted and otherwise naked." It is a matter of record that blood in the snow marked the path of those unshod troops as they marched into camp.

As a military leader Washington was superior to any of the field commanders sent over by England. In fact, his tactics in the movements on the Delaware River were characterized by Frederick the Great as the "most brilliant achievements recorded in military annals." Years later the old Prussian soldier sent his portrait to Washington, with this message: "From the oldest general in Europe to the greatest general in the world."

Coupled with his genius as a soldier was an abiding faith in the justice and ultimate triumph of the American cause. Toward the close of the struggle a movement was started to have Washington assume the title of king, but his repudiation of such a course was voiced in language as vigorous as he could make it. His great popularity never undermined his modest sense of his own worth or his deep-rooted conviction that the American nation was destined to be a democracy in which kings could have no part.

On November 2, 1783, he took final leave of his faithful army, and the following De-

cember appeared before Congress to resign the commission tendered him over seven years before. He said:

Having now finished the work assigned me, I retire from the great theatre of action, and, bidding an affectionate farewell to this august body, under whose orders I have long acted, I here offer my commission, and take my leave of all employments of public life. "You retire," replied the president of Congress, "from the theatre of action with the blessings of your fellow-citizens, but the glory of your virtues will not terminate with your military command. It will continue to animate remotest ages."

On Christmas Eve Washington arrived at Mount Vernon, where, during the interval before the organization of the government under the Constitution, he enjoyed once more the life of plantation owner and private citizen.

The Constitution and the First Administration. Five years after the signing of the peace treaty a new crisis called Washington again into public life. Under the Articles of Confederation affairs were steadily growing more chaotic, and in May, 1787, a convention was called to meet in Philadelphia to prepare a new form of union. To this body Washington was sent as head of the Virginia delegation, on its organization he was unanimously elected its president. In September the convention completed a new Constitution and gave it to the states for ratification. The influence that Washington exercised in the consummation of this great achievement is ably summarized in Woodrow Wilson's *History of the American People*:

"It gave the convention great dignity that Washington had presided over its counsels and was heart and soul for the adoption of the measures it proposed. His name and quiet force had steadied the convention on many an anxious day when disagreement threatened hopeless breach. His fame and influence infinitely strengthened also the measures proposed, now that they were completed. He supported them because they were thoroughgoing and courageous and cut to the root of the difficulties under which the country was laboring. Issue had been joined now, as he had wished to see it joined, between government or no government, and the country was to know at last where it stood in the most essential matters of its life."

It is not surprising that when the votes of the first Electoral College were counted it was found that Washington was the unanimous choice for President of the United States. John Adams was honored with the Vice-Presidency.

Washington was inaugurated in New York, which was then the national seat of government. Standing on the balcony in front of the old Federal Hall, whose site is now occupied by the imposing Subtreasury, he took the oath of office on April 30, 1789, though the legal day for the ceremony was March 4. Difficulties in setting the new machinery in motion were responsible for the delay.

From the first he displayed in civil affairs the same qualities of leadership and invariable good judgment which he had shown during his military career. He set about informing himself concerning all that had happened during the period of the Confederation—the relations of the new government to foreign nations, and the questions of internal administration and finance, which were soon to become pressing issues. He also chose a remarkably strong Cabinet, including Thomas Jefferson and Alexander Hamilton, who, though directly opposite in their political opinions, were acknowledged leaders in the political life of the country.

The selection of Alexander Hamilton as head of the Treasury Department was momentous in its results, for through his far-seeing statesmanship the country was put on a sound financial basis. In accordance with Hamilton's program the national government assumed the debts of the states incurred during the war; a national bank and a mint were established, and a national income was provided for by duties on imports and a system of internal revenue.

Other important events of the first four years under the Federal Constitution were the organization of the United States Supreme Court, the admission of Vermont (1791) and Kentucky (1792) as states, the adoption of a decimal system of coinage, and the incorporation into the Constitution of the first ten amendments. So profoundly impressed were the people with the results of Washington's first term that there was a spontaneous demand that he serve again. Against his personal wishes he consented, and was unanimously reelected, being inaugurated in Philadelphia on March 4, 1793. The city of Washington did not become the national capital until 1800.

The Second Term. During this term international affairs for a time overshadowed domestic issues. A war between France and England vastly aroused the sympathies of a group friendly to France, and there were

some extremists who demanded that the nation go to its assistance. Another faction as vehemently urged neutrality or support for England. Washington, who saw clearly that the United States was too weak and insecure to be implicated in European quarrels, issued a proclamation of neutrality and refused to take sides. An unfortunate incident of this affair was the activity of Edmond, or "Citizen," Genet, a Frenchman whose defiance of the proclamation caused the government considerable anxiety. The French sympathizers were also greatly exercised over the acceptance of the Jay Treaty (1794) with England. This treaty was not so favorable to America as its sponsors wished, but it was the best that could be obtained, and it served the purpose of averting war with England, which Washington felt would be a national calamity.

The power of the Federal government was vigorously exercised in this administration. In Pennsylvania in 1794 there occurred an insurrection in protest against the excise tax, to quell which Washington ordered out 15,000 militia. Trouble with the Indians was settled by Anthony Wayne's victory over them at Fallen Timbers in 1794, and by the negotiation of treaties. Other events include the invention of the cotton gin by Eli Whitney; the erection of the first woolen mill in Massachusetts; the admission of Tennessee into the Union, and the development of two great political parties, by followers of Hamilton and Jefferson, respectively.

The End of the Story. Washington declined a third election, delivered his famous farewell address and retired to Mount Vernon in 1797. Thereafter he devoted himself to agriculture, though in 1798, at the prospect of the war with France, he was chosen commander in chief of the United States army and accepted, though he was not called into the field. He died in December, 1799, from illness brought on by long exposure in the saddle. The news caused almost as widespread mourning in Europe as in America. The greatest statesmen and soldiers of every nation united in paying him tribute as a man, general, statesman and friend of humanity. The words of his old friend and companion, "Lighthorse Harry" Lee, "First in war, first in peace and first in the hearts of his countrymen," were without question literally true. He had avoided the snares of factional and partisan politics, had generously overlooked

Administration of George Washington, 1789-1797

I ELECTION AND INAUGURATION

II THE PRESIDENT

- (1) Birth
- (2) Ancestry
- (3) Education
- (4) Previous public career
- (5) Character
- (6) Rank as a statesman
- (7) Death

III ORGANIZATION OF THE GOVERNMENT

- (1) Strict and loose constructionists
 - (a) Followers of Hamilton
 - (b) Followers of Jefferson
- (2) Executive departments
 - (a) State
 - (b) Treasury
 - (c) War
 - (d) Attorney-General
- (3) Federal courts established, 1789
- (4) Financial measures
 - (a) The public debt
 - (b) The excise, 1791
 - (c) Bank of the United States
 - (d) The Mint
 - (e) Tariff on imports, 1789

IV DOMESTIC AFFAIRS

- (1) Governmental
 - (a) Last state ratifies the Constitution
 - (b) Census of 1790
 - (c) Whisky Insurrection, 1794
 - (d) Admission of Vermont, Kentucky, Tennessee
 - (e) Site of Washington chosen
 - (f) Ten Amendments
 - (g) Campaigns against the Indians
- (2) General
 - (a) Invention of cotton gin
 - (b) Death of Franklin
 - (c) Slavery
 - (d) Settlement of Northwest Territory

V FOREIGN AFFAIRS

- (1) Genet and quarrel with France
- (2) Jay Treaty
- (3) Treaty with Spain
 - (a) Opened the Mississippi
 - (b) Florida boundary

VI ELECTION OF 1796

- (1) Political parties
 - (a) Federalists
 - (b) Republicans
- (2) Candidates
 - (a) John Adams
 - (b) Thomas Pinckney
 - (c) Thomas Jefferson
 - (d) Aaron Burr
- (3) Election of Adams

Questions on Washington

Where was Washington at the time of his election to the Presidency?

Where was he inaugurated?

What city was the capital during most of his administration?

How does he rank as a soldier and statesman?

In what way did Hamilton's ideas influence the organization of the government?

What were the original executive departments?

Was the Attorney-General the head of a department?

Who were the members of the first Cabinet?

When were the Federal courts established?

What compromise was necessary before Hamilton could secure the assumption of the state debts?

When was the Bank of the United States organized?

What were some of its powers?

When was the first tariff law passed?

What was its primary object?

When was the first census taken?

What states were admitted during Washington's term of office?

What caused the trouble with the Indians in the Northwest?

What battles were fought and with what result?

What party was friendly to France? Why?

Gave an account of Genet's visit to the United States

What was the Jay Treaty? What did it accomplish?

the harshest criticisms and had respected and used the abilities of his severest critics and opponents. Though a slave-holder at his death, he was in favor of the gradual abolition of slavery by legislation, and by his will he arranged that his one hundred twenty-five slaves should be emancipated at the death of his wife, so that the negroes of the two estates who had intermarried might not be separated. Washington's body and that of his wife, who survived him nearly three years, rest in the family vault at Mount Vernon.

Consult Lodge's *George Washington*, in the *American Statesmen Series*, and *Fiske's Washington and His Country*, a condensed and simplified edition of *Washington Irving's Life of Washington*.

Related Articles, titles for additional information	Consult the following information
Braddock, Edward	Political Parties in the United States
Constitution	Tariff
French and Indian Wars	Revolutionary War
Genet, Edmon C	United States
Jay Treaty	Whisky Insurrection
Mount Vernon	

WASHINGTON, MARTHA (1732-1802), the wife of George Washington, born in New Kent County, Va., the daughter of John Dandridge, a wealthy planter. Her first husband, to whom she was married in 1749, was Daniel Parke Custis. She was married to George Washington in 1759. As mistress of the White House she won a firm place in the hearts of the people. She died at Mount Vernon two years and a half after the death of President Washington.

WASHINGTON, PA., the county seat of Washington County, situated thirty-two miles southwest of Pittsburgh, on the Pennsylvania and the Baltimore & Ohio railroads. It is the seat of the Washington and Jefferson College, the oldest college west of the Alleghenies, and also of the Washington Seminary. Notable structures are the Federal building, courthouse, library, sanitarium and hospital buildings. Washington is said to have erected the first community building in the United States. Glass, tubes, tin plate, pottery and baby carriages are the leading manufactures. The place was settled in 1768 and was originally called Bassettown. It received its present name in 1784 and was chartered as a borough in 1852. Population, 1920, 21,180, in 1930, 21,345, a gain of 14 per cent.

WASHINGTON, TREATY OF, the treaty between the United States and Great Britain, signed in 1781, providing for the settlement of several difficulties between the two countries, chief of which were the Alabama

claims. A commission, which consisted of five representatives of Great Britain, headed by Earl de Grey and Sir John MacDonald, and five representatives of the United States, headed by Hamilton Fish and E. R. Hoar, began its meetings May 8 at Washington. It referred the Alabama Claims to a special court, which was to meet at Geneva (see **ALABAMA, THE GENEVA ARBITRATION**). It provided for the establishment of a mixed commission, to discuss and decide upon the northwestern fisheries question, and it submitted the northwest boundary dispute to the arbitration of the emperor of Germany. It also laid down certain rules regarding neutrality in war, which were to govern the Geneva Tribunal in deciding the Alabama question and which have since been considered the true principles of international law upon the subject.

WASHINGTON, UNIVERSITY OF, a coeducational state institution founded at Seattle. It was organized in 1861, but the regular four years' courses were not established until 1877. In 1889 it became the state university, as Washington entered the Union that year. It maintains a college of liberal arts, a college of engineering, a school of forestry, a school of mines, a school of business administration, a library school, colleges of pharmacy and law and a graduate department. The university has a faculty of nearly 300, and a student body of over 5,000. The library contains over 250,000 volumes.

WASHINGTON AND LEE UNIVERSITY, an institution for men only located at Lexington, Va. It was established as the Augusta Academy in 1749 and afterwards renamed Washington Academy in recognition of a gift of money made to the institution by the "Father of his Country." This gift still yields an annual income of \$3,000. In 1865 General Robert E. Lee was made president of the institution, a position which he held with great influence upon the students for five years. In 1871 the present name of the institution was adopted. The university is divided into schools of commerce, applied science, law, journalism, and courses leading to the degrees of B.A., B.S., and LL.B. It has a faculty of about 60 members, about 900 students and property and endowment aggregating \$1,700,000.

WASHINGTON ARCH, a beautiful memorial structure, erected to commemorate the

first inauguration of George Washington as President of the United States. It stands at the foot of Fifth Avenue, New York, and was designed by Stanford White. It is of marble, seventy-seven feet high and sixty-two feet broad, with a single archway forty-seven feet high and thirty feet broad. Its cost of \$128,000 was met by popular subscription.

WASHINGTON ELM, a famous elm, formerly standing near the northwest corner of the Common, in Cambridge, Mass. Near the base was a stone seat with the inscription "Under this tree Washington took the command of the American Army July 3, 1775." Although carefully protected, the tree fell to the ground October 26, 1923.

WASHINGTON MONUMENT, an imposing marble obelisk in Washington, D. C., measuring 555 feet in height. It is situated in the Monument Gardens, south of the White House. It was begun in 1848, but was not dedicated until 1885, on Washington's birthday. The top, from which a magnificent view of the surrounding country is obtained, is reached by an elevator and by a wide, concrete interior stairway. The monument covers an area of 16,000 square feet and cost \$1,187,710.

WASHINGTON UNIVERSITY, a coeducational school at Saint Louis, Mo., founded in 1853 by Dr. William Greenleaf Eliot, on condition that it be kept nonsectarian and nonpartisan. Its activities were carried on in different parts of the city till 1905, when all were removed to the present fine location west of Forest Park. Ten new granite buildings on this site were occupied by exhibits and executive offices of the Louisiana Purchase Exposition in 1904. The departments of the university are those of engineering, architecture, law, medicine, dentistry, fine arts and social economy. The faculty numbers 600, and the student registration is about 3,500. The library contains 300,000 volumes.

WASHITA, *wash'etah*, **RIVER**, or **OUACHITA RIVER**, a river that rises in the western part of Arkansas, flows southeast and then south into Louisiana and discharges into the Red River, about fifteen miles above the confluence of that stream with the Mississippi. The Washita is connected with the Mississippi by a series of bayous. Its length is 550 miles, and it is navigable for steamboats for about 350 miles.

WASP, *wahsp*, a winged insect resembling the bee in many respects. The body is bluish in color, with yellow markings, or black, marked with white or yellow. Common wasps live in societies, or colonies, composed of males, females and workers, or neuters (see **BEES**). The females are armed with an extremely powerful and venomous sting, the males do not sting.

The nest of the wasp is ingenious, both in material and construction. It is built in the ground or attached to a wall or tree, and is composed of a kind of chewed wood pulp or paper manufactured by the females. Within these nests the combs are enclosed completely, except for the small opening where the wasps enter. The cells of the comb, in which the larvae and pupae are reared, are six-sided and arranged in tiers, with the mouth downward or sidewise.

Wasp colonies multiply rapidly, and have been known to attain to 30,000 members in a favorable summer season. But in the fall all the members perish except a few females, which pass the winter under stones or in hollow trees. Wasps are voracious insects, living upon sugar, meat, fruit, honey or the juices of other insects. Certain species live solitary lives, each mother making its own nest and caring for its own eggs and larvae.

WATAUGA ASSOCIATION, in American history a name given to an association of settlers, formed in 1772, in the eastern part of what is now Tennessee, just west of the Alleghany Mountains. Articles were drawn up for the purpose of creating a government for the district, and provision was made for five executive councilors, thirteen legislators, a sheriff and an attorney. The government had no jurisdiction over any but the signers of the compact, and the territory soon swarmed with outlaws and adventurers. In order to secure protection, the community, under the name of Washington District, asked for and secured representation in the North Carolina Assembly.

WATCH, a small, portable mechanism for measuring time, having about the same number of wheels as a clock, geared in the same manner, but differing from a clock in having a hairspring and a balance wheel, instead of a pendulum, and in having its parts much smaller and more delicately adjusted. It is attached to a chain and carried in the pocket, or to a bracelet and worn on the wrist.

Mechanism. A watch consists of two parts, the case and the works. The case is of metal, usually gold or silver, and it is made with one or two covers. The works consist of two plates, perforated for the purpose of holding the wheels in position, and so arranged that they contain, between them, all of the wheels except the balance wheel. The lower plate, known as the pillar plate, rests next to the dial. The upper plate may be in one or in several pieces, but in the best-made watches it is usually in one piece. These plates are bored and chiseled so that each wheel fits perfectly into its place. The perforations, in which the minute axles of the wheels rest, are usually set in jewels, which prevent wear. There are four wheels in the watch, these are (1) the barrel wheel, within which the mainspring is attached, (2) the first wheel, (3) the second wheel and (4) the third wheel, which is attached to the pinion of the escapement wheel. The motion is imparted by the uncoiling of the spring and is regulated by the escapement, which is kept in operation by the action of the mainspring and the hairspring combined, the two giving it an oscillating movement. The wheel which meshes into the pinion of the escapement wheel revolves once a minute and has sixty teeth upon its circumference. The pinion of this wheel meshes into the circumference of the wheel which gives the motion to the minute hand, and this meshes into the pinion of the center wheel, which gives the motion to the hour hand. The watch is regulated by a lever device, connected with the hairspring. By moving this to the right, or left, the tension is lessened or strengthened.

Watch Making. The works of a watch have for their foundation two plates of an alloy of brass and nickel. These plates are cut at the foundry, where the metal is cast, from dies furnished by the watch factory.

The rough plates are passed under trimming, or stripping, punches, which smooth off the roughness. Indentations absolutely exact are then made in the foundation plate, to allow room for the wheels. The plate is placed under the lathe portion of a machine, and a steel copy of what it is to be is fastened to another part. The machine follows the outline of the steel model, gradually cutting out the foundation plate, so that the various parts of the mechanism of the watch will be thrown into proper position. The

thickness of the plate and the depth of the indentations are measured so as to be perfect, according to a gauge, two degrees of which equal the thousandth part of an inch. The necessary screw holes and apertures for the settings are then drilled into the plate. The work on the upper plate is done in the same manner. The plates are then polished and smoothed down, on an Ayr stone, a stone harder than a soapstone and softer than emery, capable of polishing without scratching.

The jewels used in watch making are garnets, rubies, sapphires and diamonds. Garnets are most common and are cut with diamond points into minute disks and then smoothed and pierced. These disks are set in larger disks of gold. The foundation plates are given an ordinary heavy plating of gold, by the battery process, and the jewels with their settings are fitted and fastened into the plate by exceedingly small screws.

The wheels of a watch are stamped out of sheets of brass, with the exception of one or two pieces. The screws and springs are made from sheet steel, the screws being cold-drawn from wire. In tempering some of the screws, the workman uses a thermometer of a peculiar sort, in order to regulate accurately the temperature to which they are to be heated and cooled. Others are regulated by a careful observation of their color. The figures are printed on the dial by a process resembling lithography (see LITHOGRAPHY). The base of the dial is of copper and is stamped out of a thin sheet of the metal, in such a manner that a rim is left turned up for a short distance all around. Powdered enamel is spread on the disk, and it is then fired, like pottery or china. Steel plates are engraved with the design to be executed, and the lines are filled with a mineral paint of the desired color. The plate is then passed under a roller, covered with sheet rubber, and the dial receives the impression from the rubber on the roller. It is again fired, and when fancy colors are employed, each color requires a separate impression and firing. The balance wheel requires forty different steps in its manufacture.

When all the parts are assembled, the watch is taken to a refrigerator and subjected to cold. This is followed by a period in a hot air compartment, the two tests ranging from 40° to 103° F. The making of

watches by hand is thought to have originated in Germany about 1500. Since the advent of the machine-made watch, the United States has reached the foremost position as a watch-manufacturing country. The largest watch factory in the world is at Waltham, Mass., and another, nearly as large, is located at Elgin, Ill. See *Clock*.

WATER, the liquid that covers five-sevenths of the earth and is essential to all animal and vegetable life, is a chemical compound of hydrogen and oxygen in proportion of two atoms of the former to one of the latter. Its chemical symbol, therefore, is H_2O . Pure water is a colorless, tasteless, odorless liquid. It appears blue, like the atmosphere, when seen in mass.

Three Forms of Water. Water takes three forms, each depending upon temperature. It takes a solid form, that of ice or snow, at 32° Fahrenheit (0° Centigrade) and all lower temperatures, and it takes the form of vapor or steam at 212° F (100° C) under a pressure of 29.9 inches of mercury, and it retains that form at all higher temperatures. Under ordinary conditions, water possesses the liquid form only at temperatures lying between 32° and 212° . It is, however, possible to cool water very considerably below 32° F and yet maintain it in the liquid form. Water may also be heated, under pressure in the laboratory, many degrees above 212° F, without passing into the state of steam.

The specific gravity of water is 1 at 39.2° F, (that is, one cubic centimeter of water weighs one gram), and it is the unit to which the specific gravities of all solids and liquids are referred, as a convenient standard, one cubic inch of water, at 62° F and 29.9 inches barometrical pressure, weighs 252.458 grams. Distilled water is 815 times heavier than atmospheric air. Water is at its greatest density at 39.2° F (4° C), and in this respect it presents a singular exception to the general law of expansion by heat. If water at 39.2° F be cooled, it expands as it cools, till reduced to 32° , when it solidifies, and if water at 39.2° F be heated, it expands as the temperature increases, in accordance with the general law. Were it not for this peculiar property of water, ice would settle to the bottom of lakes and streams and they would become masses of solid ice, a condition which would soon destroy all life upon the earth.

So-called *heavy water* differs from ordinary water in having two atoms of heavy hydrogen and one atom of oxygen.

Water as a Solvent. From a chemical point of view, water is a neutral fluid and shows in itself neither acid nor basic properties, but it combines with both acids and bases, forming *hydrates*, and with neutral salts. Water also enters, as a liquid, into physical combination with the greater number of all known substances. Of all liquids, water is the most powerful and general solvent, and on this important property its use depends. In consequence of the great solvent power of water, it is never found pure in nature. Even in rain water, which is the purest, there are always traces of carbonic acid, ammonia and sea salt. Where the rain water has filtered through rocks and soils and reappears as spring or river water, it is always more or less charged with salts derived from the earth, such as sea salts, gypsum and chalk. When the proportion of these is small, the water is called *soft*, when larger, it is called *hard water*. The former dissolves soap better and is therefore preferred for washing, the latter is often pleasanter to drink. The only way to obtain perfectly pure water is to distill it, but water simply held in suspension may be taken out by suitable filtration.

Sources of Water. The great reservoirs of water on the globe are the seas and lakes, which cover more than three-fifths of its surface, and from which water is raised by evaporation. Uniting with the air in the state of vapor, it is wafted over the earth, ready to be precipitated in the form of rain, snow or hail. Water, like air, is absolutely necessary to life, and healthy human life requires that it should be free from contamination, hence, an ample and pure water supply is considered as one of the first laws of sanitation.

Related Articles titles for additional information		Consult the following
Boiling Point	Frost	River
Chemistry	Hail	Snow
Cloud	Humidity	Spring
Dew	Hydrogen	Steam
Distillation	Ice	Vapor
Erosion	Mineral Waters	Water Power
Evaporation	Ocean	Water Purification
Freezing	Rain	

WATER, ORDEAL BY. See *ORDEAL*.
WATER BEETLE, any representative of several families of beetles which live in or upon the water. Three of the families include

beetles which live permanently in water, the rest include those species which live in the water only in the larvæ (young) stage.

The *diving beetle* has a flat, oval body, over which the wings fit tight. The hind legs, which have a fringe of hairs, are flattened and adapted to swimming, the front legs are short. The common *water beetle* seen in summer darting over the surface of ponds has a water-tight compartment beneath the close-fitting wings for the storage of breathing air. In the evening these beetles leave the water and fly about. The larvæ, called *water tigers*, are exceedingly rapacious, seizing in their sickle-like jaws small fish, tadpoles and other larvæ, from which they suck the juices. Breathing is effected through tubes terminating in the tail, which is raised above the surface of the water.

The *whirligig beetles*, so called from their habit of moving in circles on the water, have long, clawed front legs and shorter, paddle-shaped hind legs. The body has an oily surface unaffected by water, and the compound eyes are adapted for vision in water and in air. One of the largest of the water beetles is the glossy *black beetle*, often seen on the wing at night. These insects can be transferred to an indoor aquarium, and their whole interesting life history may be studied in the school room. See **BEETLE**.

WATER BUG, a name applied to any insect belonging to one of six large families, including *water striders*, *water boatmen*, *water scorpions*, *toad bugs* and *fishkillers*. All have flat bodies, and are equipped with oar-shaped legs for swimming. They may be seen on summer days darting over the surface of ponds and lagoons or resting quietly on the surface, their bodies being buoyed up by the air stored in various parts of the insects. If alarmed, they may dive to the bottom and cling to plants or stones. About a dozen species are found in America. Some of them leave the water and fly around lights at night, the electric light bug is one of these. Some of the adults lie dormant in the mud of water bottoms in winter; others hibernate in rubbish on the banks, and here the eggs are deposited. When the young hatch they tumble into the water and feed on insects and other small animal food. The females of some species bore holes in aquatic plants and deposit their eggs there. In the United States the *craton bug*, a house pest resembling the cockroach, is incorrectly called

water bug, because it is usually seen on or near warm-water pipes.

WATERBURY, CONN., one of the county seats of New Haven County, thirty miles southwest of Hartford, on the Naugatuck River and on the New York, New Haven & Hartford Railroad. It is an important manufacturing center, leading the United States in brass and copper goods and for this reason sometimes known as the "Brass City." The famous Waterbury watches have been manufactured here in immense numbers since 1879. There are also button factories, foundries, machine shops, knitting mills, clock factories, bottling works, publishing houses and engraving establishments.

Among the educational institutions are Saint Margaret's School for girls, Convent of Notre Dame, Gerard School, two business colleges and a public high school. Other important features are the Bronson Public Library, Waterbury Hospital, St. Mary's Hospital, Southmayd Home for old ladies, the city hall and the Masonic Temple. The place was settled in 1677 and was known by the Indian name of Mattatuck until its incorporation as a town, in 1686. It was chartered as a city in 1853. In 1691 it suffered from a flood; in 1712 an epidemic proved fatal to about one-tenth of the population, and in 1902 a large portion of the business section was destroyed by fire. The town and city of Waterbury were consolidated in 1900 and cover an area of twenty-eight square miles. Population, 1920, 91,715, in 1930, 99,902.

WATER COLORS, pigments mixed and ground with gum size or some other adhesive substance, instead of oil. The water colors used in painting pictures are in the form of small, dry and hard cakes, while those used in coloring walls and the like are simply mixed up with glue or size. The quick drying of water colors is favorable to rapid execution, and a greater clearness and transparency is obtained than in an oil painting.

WATER DOG. See **MUD PUPPY**.

WATERFALL. See **CATARACT**.

WATER LILY, a water plant with a gorgeous blossom, found in quiet waters of the temperate and torrid zones. From the oozy bottom the stems rise to the top of the water; there the leaves open out and lie flat upon the surface, and the buds unfold, disclosing numerous petals, stamens and carpels. The flowers may be pink, white or blue, and

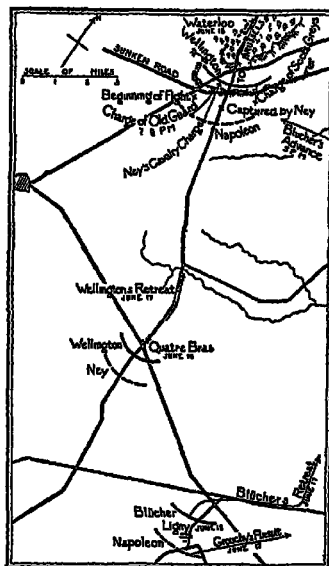
sometimes they are very fragrant The most famous of water lilies is the Queen Victoria, a native of South America The leaves, six feet or more in diameter, are flat, with upturned rim, and are often strong enough to support a man's weight The blossoms, a foot in diameter, open on two successive nights, the first night they are white and fragrant, the second, pink and malodorous.

The Australian water lily is often as large and is usually blue The Egyptian lotus is also a blue lily, famous since remote antiquity The American pond lily is a lovely, creamy-white flower, with petals radiating in circles and a cluster of golden stamens It expands to the sunshine and closes at dusk The golden lily of Florida is a handsome flower, and the common yellow water lily of higher latitudes is less showy, but blooms all summer A rose-colored variety is also found in North America The seeds of the pond lily he sunk in pits in the flattened top of a hemispherical pod Those of several species are edible, and are sometimes called *water chinquapin* They were an important article of food among the Indians

WATERLOO, BATTLE OF, the famous battle, fought June 18, 1815, near Waterloo, a village in Belgium about eleven miles south of Brussels, between Napoleon and the allied forces under Blücher and Wellington It was Napoleon's last battle, and it put an end to his power (see **HUNDRED DAYS**). There had been two preliminary battles on the 16th, one at Quatre-Bras, by which Ney, although forced to retire, prevented Wellington from joining his Prussian allies, and one at Ligny, in which the Prussians under Blücher were defeated by Napoleon On the morning of the eighteenth the main French army was drawn up near Waterloo, opposite the allied British, Dutch and German forces, under Wellington Blücher, with the Prussian army, was absent at the opening of the fight The French army numbered about 72,000, the allied army about 67,000, of which number many were untrained troops

Napoleon's plan was to defeat Wellington before Blücher could come up with his troops, but the ground was in such a condition from the rain that had fallen all night that he was obliged to delay opening battle until almost noon Wellington, on the contrary, simply aimed to hold out until the Prussians arrived, when a combined attack might be made on

the French In accordance with these plans the struggle throughout the day consisted chiefly of charges, brilliant but unsuccessful, on the part of the French, and firm resistance on the part of the English The French



BATTLE OF WATERLOO

cavalry, charging during the afternoon, plunged into an unseen sunken road, and unable to check their rush, they filled the great ditch with troopers, over whom the remainder rode on These repeated charges, although stubbornly resisted, had their effect, and the outcome of the battle remained doubtful until late in the day, when the arrival of the Prussians, at a time when both armies were about exhausted completely turned the tide against the French Napoleon's last effort was the charge of the Old Guard, the picked veterans from the Imperial Guard, late in the evening Its rout was complete, and many of its squares, refusing to surrender or retreat, fell to the last man Wellington now gave the order for a general advance, and the French, utterly overpowered, gave way at every point The army broke up in confusion, and the dis-

astrous retreat, with the Prussians in pursuit, lasted through the night Napoleon himself escaped by flight The French lost in this battle probably thirty-one thousand in killed, wounded and missing, while the allies lost over twenty-two thousand

The importance of the Battle of Waterloo as the means of finally crushing Napoleon has been somewhat exaggerated Even had he been successful on that day, he could never have regained his old power But the accomplishment of his overthrow that early in his campaign was fortunate for the allies and for the French, as it saved further bloodshed See NAPOLION I

WATERLOO, Iowa, the fifth city in the state in size, is the county seat of Black Hawk County, on the Red Cedar River and on the Chicago, Rock Island & Pacific, the Illinois Central, and the Chicago Great Western railroad There is an airport Waterloo is one of Iowa's rapidly growing cities It is known as the "Factory City," it manufactures about twenty per cent of all the United States-made gasoline engines of the farm type There are also foundries, malleable iron works, concrete works, machine shops, farm implement factories, packing houses, automobile fabric plants, refrigerator and cream separator factories

The principal structures are a Federal building, a courthouse, municipal buildings, two Carnegie Libraries, Presbyterian, Allen, and St Francis hospitals, adequate hotel facilities, and imposing bank buildings and business blocks There are two business colleges, several private schools, and 45 churches The city was settled about 1845, and was incorporated in 1869 Population, 1920, 36,230, in 1930, 46,191, a gain of 27.5 per cent

WATERLOO, Ont., on the Canadian National Ry., three miles northwest of Kitchener It is an important center for manufacturing, furniture, boots and shoes, threshing machines, buttons, mattresses, washing machines, trunks and bags, bricks and tiles being the most important products Niagara electric power is furnished to the factories There are good public and separate schools and six churches Population, 1931, 8,095

WATERMELON, a creeping variety of gourd The rind of the fruit is smooth and dark green when ripe, the inside of the melon is a coarse red or yellowish pulp, ninety per cent of which is water Its native home was Africa, but it has been widely cul-

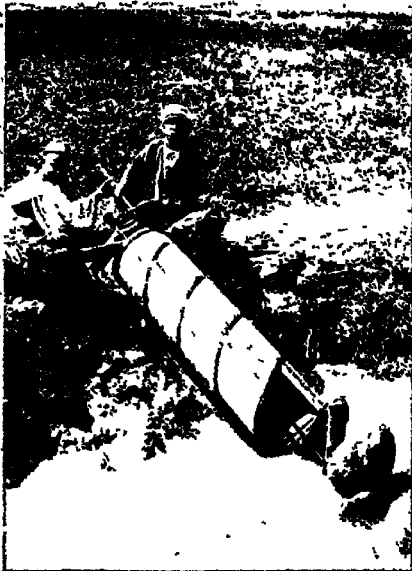
tivated from remote times It is very popular in the United States, where it has become a most important crop for the fruit-growers of the South Atlantic and Gulf states, in which sections thousands of acres are devoted to raising melons for the northern market Watermelons in smaller quantities are raised as far north as Southern Ontario The ideal soil for melon culture is light, sandy loam, which is naturally dry or else thoroughly drained Most melons weigh from twenty to fifty pounds.

WATER PLANTS. See **AQUATIC PLANTS**

WATER POLO, a ball game similar to hockey, played by swimmers, with a ball filled with air, which floats It is a good game for swimming tanks, and is then played generally throughout the winter season. The object of the game, of course, is for one side to carry, push or throw the ball to the opponent's goal line, at the end of the tank.

WATER POWER. A waterfall capable of being "harnessed" to perform work has been appropriately referred to as "white coal" Much of the machinery of the world is operated directly or indirectly by water power A great factory located where the power of falling water is available may be electrically operated, but water power may be utilized to generate the electric current The installment of a water-power plant usually requires the construction of a dam, a canal or flume to conduct the water to the great paddle wheel, where the power of the water is applied The original expense may be greater than that of a steam or electric plant, but the extra cost is soon recovered by the saving in operating expenses See **WATER WHEEL**

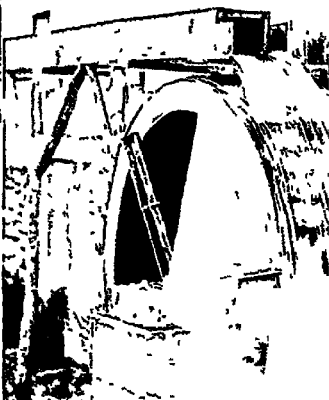
Classification Water-power plants are divided into three classes—*low-head*, *medium-head*, and *high-head*, according to the height of the fall. Low-head plants have a fall not exceeding 100 feet, medium-head, not exceeding 350 feet, and the high-head class includes all plants having a fall of more than 350 feet. The fall of some plants in this class exceeds 5,000 feet Most of the great plants are of low-head type, and they are located on the banks of large streams They gain in volume what they lose in fall The largest plants of this type are at the Wilson Dam in Alabama and one at Keokuk, Iowa The most noted plant of the medium-head type is at Niagara Falls.



ANCIENT DEVICES

Early methods of raising water and of utilizing its power are in use today. The Archimedeian screw invented 200 B. C., is still used in Egypt, the Orient and elsewhere. Foot-power, undershot and overshot waterwheels generate power to operate machines.

Kaufmann Fabry



Plants of the high-head type are usually found on mountain streams having a rapid flow and small volume of water. A dam is constructed across a deep, narrow valley to impound the water, which is conducted to the power house through steel pipes. The power house may be two or three miles below the dam, so a high fall is secured. These plants are operated by a small volume of water under very high pressure and they require a special type of water wheel (see **TURBINE WHEEL**). Their principal use is in generating electric power, which is often carried long distances over wires. The power used in operating the street cars in San Francisco, for instance, is generated over 125 miles from the city.

Estimating Water Power. The power of water for operating machinery is derived from its weight or pressure. The pressure of a column of water of a given height is equal to the weight of the water. A cubic foot of water weighs 62.5 pounds; therefore a column of water one foot square and ten feet high weighs 625 pounds, and at its base exerts a pressure on a square foot equal to that weight. The rule for estimating the horse power of a water fall is as follows: Multiply the flow in cubic feet per second by the height of the fall and this product by 1134. A fall of 100 feet and 600 cubic feet flow will have a power equal to $100 \times 600 \times 1134$, or 6,804 horse power.

Government Ownership. In the United States all water power on government land is under control of the government, and since the beginning of the present century stringent laws for preventing great power sites from falling into the hands of monopolists have been passed. Unfortunately, however, before the conservation movement was started, many valuable sites had been appropriated by capitalists and a legal claim to them had been established. Since water, like air, is one of the great natural resources of a country, the theory of the most enlightened governments is that it belongs to all the people; therefore all water power should be under control of the government, and it should be leased, not sold. Canada is far ahead of the United States in this respect, for in Canada all water power is under government control. Power sites may be leased, but none can be purchased.

It is estimated that the total water power of the United States is 30,000,000 horse

power, and that less than one-sixth of it has been developed. The water power of Canada is estimated at 43,000,000 horse power, only about fifteen per cent of which has been developed. Europe has 41,000,000 horse power, and utilizes only one-tenth of it. The water power of the other continents is not known.

WATERPROOFING, a process of rendering cloth and other articles proof against water. In the preparation of mackintoshes a solution of rubber is spread on the goods, and the cloth is doubled, pressed and finished with the waterproof layer in the middle. Such goods are impervious both to air and to water, but from a sanitary point of view they are not desirable for constant wear. A new process has been introduced, which renders the fabrics proof against water, but does not obstruct ventilation. The materials are saturated with soap and then dipped in an alum solution. Still another process, by which the same result is obtained, consists of treating the fibers of the cloth, instead of the manufactured, woven fabric, with the solution. Paraffin is often used as a substitute for rubber in waterproofing leather, wood and various other substances. Paper is made waterproof by immersing it in a solution of shellac in borax, a treatment which causes it to resemble parchment paper.

WATER PURIFICATION. Pure water is essential to health, and often one of the most perplexing problems connected with water supply is that of securing pure water. Because of its solvent power, all water obtained from natural sources contains more or less impurities, some of which may be highly injurious. Among the mineral impurities held in solution are usually found lime, iron, compounds of sulphur and sometimes compounds of lead. Impurities present but not held in solution are clay particles of soil, animal and vegetable matter and bacteria. Lime and sulphur are not injurious to health, neither is iron, unless it occurs in excess. The presence of clay, sand and organic matter makes the water turbid, and the organic matter renders the water dangerous to health. All these substances should be removed by purification processes.

The processes employed for purifying water on a large scale include settling or sedimentation, filtering and chemical treatment. Settling is secured by allowing the water to remain quietly in large tanks, from

which it flows slowly from the top. Where the water contains a large quantity of solid matter two or three settling tanks may be necessary, but usually one is sufficient. The sand and gravel of the earth form a natural filter for spring water, and this sort of filter is used in water purification. The filters consist of large tanks with perforated bottoms, over which layers of gravel and sand are placed. As the water percolates through these layers the solid matter and most of the bacteria are removed. If the water contains a large proportion of lime, it may be treated with a solution of sulphate of alumina. The lime separates this compound into alumina and sulphuric acid. The acid unites with the lime or magnesia in the water and renders it harmless, and the alumina coagulates and deposits the organic matter.

Home Tests. Epidemics of typhoid, diphtheria and other contagious diseases are often traced to impure water. Because water is clear, it does not follow that it is pure. A glass of the most sparkling water imaginable may contain millions of death-dealing germs, and every household should know of simple means of testing water whose purity is suspected. The following tests can be applied by any one at practically no expense:

(1) Into a vial containing about two ounces of water put a quantity of granulated sugar equal in volume to a pea or small bean. When the sugar is dissolved, cork the vial and set it in a warm place for forty-eight hours. If, when the cork is removed, the water emits a disagreeable odor, it is unsafe.

(2) Makes a solution of permanganate of potash by dropping into an ounce of water a few crystals of this substance, which can be obtained at any drug store. Into a glass of the suspected water place a few drops of the solution. If the purple color disappears, the water is unsafe.

These tests are satisfactory within certain limits, but all water suspected of pollution should be tested by a chemist, any householder may have this done free of charge by sending a sample of the water to the State Department of Public Health. Water for household purposes should not be run through lead pipes, for it may attack the lead and form poisonous compounds. See **LEAD POISONING**.

Many cities impregnate their water with chlorine before it reaches the water mains.

WATERSHED, an elevation of land which separates the headwaters of natural drainage systems. Such a configuration of land is

sometimes called a *divide*. A watershed separating great river systems may be only a slight rise of ground, such as the divide between the waters flowing into Hudson Bay on the north and the Gulf of Mexico or the Atlantic on the south and east. Again it may be a range of lofty mountains, such as the Rockies, which separate the headwaters of streams flowing respectively into the Mississippi and the Pacific.

WATER SPOUT, a whirling column of water, extending from a cloud to the surface of a body of water, like the ocean or a lake. The presence of this column is marked by the cloud of vapor which it contains. This cloud is formed by the rapid condensation of the moisture in the atmosphere, due to expansion and rapid cooling, caused by the low pressure in the area occupied by the column. If the conditions continue a sufficient length of time, rain is produced and sometimes falls in such quantities as to constitute a small deluge. In waterspouts over the ocean, the lower part of the column may contain vapor from salt water, but usually the vapor is that of fresh water. Waterspouts are caused in the same way as whirlwinds. See **WHIRLWIND**.

WATERTOWN, N. Y., the county seat of Jefferson County, seventy-three miles north-east of Syracuse, on the Black River and on the New York Central Railroad. The city is the center of one of the most productive dairying regions of the country. The river furnishes extensive water power, and there are large manufactures of paper-making machinery, air brakes, clothing, plumbing supplies, thermometers, and paper specialties. The principal buildings include a Federal Building, a Masonic Temple, a Y M C A, the Flower Memorial Library, a courthouse, an armory, a county tuberculosis sanitarium, a hydroelectric power plant, a county historical museum, and a public zoo. The city has two hospitals, two orphanages and a home for the aged. Watertown was settled in 1800, was made the county seat in 1805, and was chartered as a city in 1869. It adopted the commission-manager form of government in 1920. Population, 1920, 31,253, in 1930, 32,205, a gain of 3 per cent.

WATERTOWN, S. D., the county seat of Coddington County, 214 miles west of Minneapolis, on the Big Sioux River and on the Chicago & North Western, the Chicago, Rock Island & Pacific, the Great Northern and

the Minneapolis & Saint Louis railroads. It is about three miles from Lake Kampeska, a resort for camping and fishing. Watertown is an important shipping point for grain and stock. There are large grain elevators, warehouses and flouring mills. Leather goods, agricultural implements, carriages and wagons, foundry and machine shop products are manufactured. The city has a Carnegie Library and two hospitals. It is under the commission form of government. Population, 1930, 10,214.

WATERVILLE, MAINE, a city in Kennebec County, seventeen miles northeast of Augusta, on the Kennebec River and on the Maine Central Railroad. There is an airport. Colby College, Coburn Classical Institute, a Carnegie Library and the historical society are notable institutions. The principal industrial establishments are run by water power from the river and include cotton mills, woolen mills, and railroad shops. The first settlement was made here about 1760, but it remained a part of Winslow until 1802. The city was chartered in 1888. Government is by mayor and council. Population, 1930, 15,454.

WATERVILLE, New York, a city in Albany County, on the Hudson River, opposite Troy, near the terminals of the Erie and Champlain canals, and on the Delaware & Hudson railroad. A United States arsenal was established here in 1807 on a reservation of 109 acres, and has since been one of the largest permanent centers in the country for the manufacture of war materials. Other manufactures include woolen goods and iron and lumber products. The place was originally called West Troy. It was incorporated as a village in 1836 and as a city in 1897.

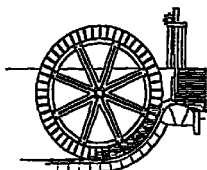
The first Shaker settlement in America was here. Population, 1930, 16,083.

WATER WHEEL, a wheel constructed and set up for operating machinery by water power.

The old style water wheels were large wooden structures, rotating upon a horizontal axis. They were constructed of two frames, from

four to six feet apart, joined at their circumferences, with buckets or floats attached, as occasion required. They were known as *overshot* or *undershot* wheels, according to the method of operating, the overshot wheel receiving water at the top, and the undershot at the bottom. Each of these is described under its respective title. The *breast* wheel has the water admitted to the floats at a point horizontally opposite the axle.

A recent modification of the undershot wheel consists of a small iron wheel, with cups or buckets upon its circumference, the whole enclosed in an iron box. This is often known as the *impact wheel* or *water motor*. The water issues from a small nozzle under very high pressure, and as it strikes the box it causes the wheel to revolve with great rapidity.

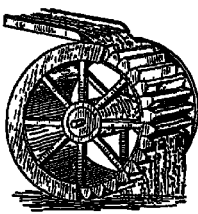


BREAST WHEEL

These wheels are convenient, because of their small size and the ease with which they can be placed in almost any desired position, but they are of use only in cities where the waterworks enable a high pressure to be obtained. Another form of wheel in common use is the turbine. See **TURBINE WHEEL**, **WATER POWER**.

WATERWORKS, the system of reservoirs, pumps and mains arranged for supplying a community with water for domestic use, manufacturing purposes, fire protection and street and lawn sprinkling. The water supply of large cities is usually conducted from near-by lakes or rivers, small towns obtain their supply from springs or wells. The selection of a source of supply must be made with great care, in order that it may be free from decaying animal and vegetable matter and other organic impurities. It must also be free from sewage contamination. Cool water is considered better than warm, because it is less hospitable to the propagation of life.

Where the source of supply is a long distance from the city, a reservoir is usually constructed, which is connected with the city by an aqueduct emptying into one or more smaller reservoirs, as in the New York City plant. From these reservoirs the water is distributed through mains to different



OVERSHOT WHEEL

portions of the city, and from the mains to consumers. When situated near a suitable source of supply, the water is pumped directly through the mains, as is the case in Chicago, which secures its water from Lake Michigan. Small cities commonly use standpipes for reservoirs. These are constructed of iron or steel, and are mounted on foundations of masonry.

WATSON, Watson, JOHN (1850-1907), well known under the pen name of Ian MacIver, an English author and clergyman, born at Manningtree, in Essex, of Scotch parents. He graduated in 1870 at the University of Edinburgh, and studied theology at New College, Edinburgh, and at Tübingen. His first charge was at Logiealmond, in Perthshire. In 1877 he became associate pastor of Saint Matthew's Church, Glasgow, and he took charge of the Sefton Park Presbyterian Church, Liverpool, in 1880. A number of sketches of humble Scottish life, which were published in the *British Weekly*, were in 1894 collected into a little volume called *B-side the Bonnie Brier Bush*, and it is by this work that he is best known. Among his other writings are *The Days of Auld Lang Syne*, *Kate Carnegie*, *The Mind of the Master* and *A Doctor of the Old School*.

WATSON, THOMAS E (1856-1922), an American lawyer, politician and journalist, born in Columbia County, Ga. He studied at Mercer College, Macon, taught school for a time and was admitted to the bar in 1875. After practicing for a time in Thompson, Ga., he became a member of the state legislature, and was elected to Congress in 1891 as a Populist. He was defeated in the two following elections. During his term he fought for and secured the first appropriation for rural free delivery. In 1896 he was the Populist candidate for Vice-President of the United States, and in 1904 was the candidate of the same party for President. Though he made an active campaign, he received no electoral votes. He edited, at New York, *Watson's Jeffersonian Magazine* and *The Weekly Jeffersonian*. Among his published works are *Life of Napoleon*, *Life of Thomas Jefferson*, *The Story of France*, *The Roman Catholic Hierarchy* and *The House of Hapsburg*.

WATSON, WILLIAM (1838-1935), an English poet, author of *Purple East*, containing his best sonnets; *The Year of Shame*, an indictment of England's policy in the Orient;

The Hope of the World; *Studies in Poetry and Criticism*, and other works.

WATT, wagt, in electricity the unit of power or measure of the rate of current, so named in recognition of James Watt, the inventor. It is equal to the pressure of one volt with a flow of one ampere per second. A thousand watts form a kilowatt, the measure of power; in most common use 746 watts equal one horse power.

WATT, wagt, JAMES (1736-1819), a Scottish engineer, celebrated for the improvements he made in the steam engine. He was born at Greenock, Scotland. Having determined to adopt the trade of making mathematical instruments, Watt went to London, at the age of eighteen, to learn the art; but ill health compelled him to return after only a year's apprenticeship. Shortly after his return he was appointed maker of mathematical instruments for the University of Glasgow. Resigning this position after a time, he worked as a civil engineer, making surveys for canals and harbors. In 1764 while repairing a Newcomen engine, Watt made experiments which resulted in the improvements that have made his name famous. In partnership with Matthew Boulton, a Birmingham manufacturer, he founded, at Soho, a factory where, in 1774, was completed the prototype, in principle, of the steam engine of to-day.

Watt was a fellow of the Royal Societies of London and Edinburgh and a member of the National Institute of France. Besides improving the steam engine, he invented or improved a variety of mechanical appliances, including a letter-copying press, a machine for reproducing sculpture and a fuel-saving furnace. See **STEAM ENGINE**.

WATTEAU, wah to', JFAN ANTOINE (1684-1721), one of the most celebrated painters of the eighteenth century, born of humble parents, in Flanders. At eighteen he went to Paris, where after years of struggle in obscurity he became a court favorite. In time his reputation extended throughout



JAMES WATT

Europe His name is chiefly associated with a style characterized by ideal gardens and woodlands peopled with richly costumed men and women, who disport themselves with all the airs and formal graces of the times In 1717 Watteau became a member of the Academy He was a favorite of Frederick the Great, and to-day the finest collection of Watteaus in the world is owned by Germany

WATTERSON, *wa' tur son*, HENRY (1840-1921), for nearly fifty years one of the most influential newspaper editors in the United States He was born at Washington, D C, was privately educated and at the age of twenty joined the staff of the *Washington Star* He removed to Nashville in 1861, where he edited the *Republican Banner*, and during the Civil War he served in the Confederate army. The *Republican Banner* was revived after the close of the war, and in 1867 Watterson went to Louisville, where he founded the *Journal*, later consolidated with the *Courier*, and then known as the *Courier-Journal* He steadily refused office, but in 1876 he accepted a seat in Congress, serving with distinction, but declining reelection From 1872 to 1892 he was a delegate at large to every Democratic national convention, and he was until his retirement from active service in 1918 a power in national politics, through his editorials in the *Courier-Journal* and his strong personality. In 1919 he published *Looking Backward*, a series of sketches in which he reviewed in a personal vein his country's history for five decades

WATTS, *wots*, GEORGE FREDERICK (1817-1904), an English artist, famous for his portraits, but chiefly for allegorical and symbolical pictures in which he attempted to show the power of love and the ugliness of greed Watts was born in London, and at the age of thirty he married the actress Ellen Terry The marriage was soon annulled Among his more important pictures are *Love and Death*, now in Washington, *Life's Illusion*, *The Window Seat* and *Sir Galahad* He is one of the most subtle and powerful of portrait painters, among his successful work in this line being portraits of Tennyson, Millais, Sir Frederick Leighton, Cardinal Manning and Browning

More than almost any other artist, he devoted himself to the artistic interests of the nation, gratuitously decorating the din-

ing hall of Lincoln's Inn and giving the best of his work to form the nucleus of the National Gallery of British Art The principles of his art are best summed up in his own words, "The end of art must be the expression of some weighty principle of spiritual significance, the illustration of great truth"

WATTS, ISAAC (1674-1743), an English clergyman and writer, noted for his hymns He was born at Southampton After tutoring six years, he became minister of the Independent Church in Mark Lane, in 1702 A severe illness ended this engagement and Watts spent the remainder of his life with Sir Thomas Abney, at Theobalds Among his works are *Divine and Moral Songs for Children*, *Hymns and Spiritual Songs*, *Psalms of David Imitated and Horae Lyricae*, the last three containing nearly five hundred hymns and versions "When I survey the wondrous cross" is said to be Watts's finest hymn, and with Ken's *Morning Hymn*, Charles Wesley's "Hark, the Herald Angels" and Toplady's "Rock of Ages," it stands at the head of all hymns in the English language

WAUKEGAN, *waw' le' gon*, ILL, the county seat of Lake County, thirty-five miles north of Chicago, on Lake Michigan and on the Chicago & North Western and the Elgin, Joliet & Eastern railroads It has an excellent harbor, with boat service to Chicago, Milwaukee and other lake ports, and is the center of a large trade in farm and dairy products Industrial establishments include steel and wire works, brass and iron foundries, leather factories, and manufactories of locks, boats, doors, motors, pharmacy supplies, and ladies' garments Notable features are the government harbor and piers, Federal building, courthouse, Carnegie library and Masonic Temple Sheridan Road, an automobile boulevard extending from Chicago to Milwaukee, passes through Waukegan, on this road just north of the city is the Bowen Country Club, the summer camp of Hull House, Chicago The Great Lakes Naval Training Station is located three miles south of the city

Waukegan was settled by New England and Southern frontiersmen interested in establishing a shipping point for grain It is said to be older than Chicago, and at one time it promised to surpass the younger settlement. It was incorporated as a village

in 1849, became a city in 1859. Commission government was succeeded by the mayor-council system. Population, 1920, 19,226, in 1930, 33,499, a gain of 74 per cent.

WAUKESHA, *wau'keshaw*, Wis., the county seat of Waukesha County, seventeen miles west of Milwaukee, on the Fox River and on the Chicago, Milwaukee, Saint Paul & Pacific, the Chicago & North Western and the "Soo Line" railroads. There is an airport. It has numerous mineral springs, and its principal industry is the bottling and shipping of water. There are also structural steel works, steel-bridge and malleable-iron works, plow and motor works and canning factories. Carroll College and the state industrial school for boys are located here. Other features of interest are the Rest Haven sanitarium, the courthouse, a public library and three parks. The place was settled in 1836, and incorporated in 1848. Population, 1920, 12,558, in 1930, 17,176.

WAUSAU, *wau'saw*, Wis., the county seat of Marathon County, 180 miles northwest of Milwaukee, on the Wisconsin River and on the Chicago & North Western and the Chicago, Milwaukee, Saint Paul & Pacific railroads. It is surrounded by a lumbering, agricultural and dairying section, which also has extensive granite quarries. The river furnishes good water power, and the city maintains sawmills, cash and blind factories, machine shops, box and veneer factories, also paper and flour mills. A county training school for teachers, a county school of agriculture and domestic science, an asylum for the insane and a tuberculosis sanitarium are located here. The city also has a public library, a hospital, a fine courthouse and a city hall. The place was settled in 1842, and was at first known as Big Bull Falls. It was chartered as a city in 1872. Population, 1920, 18,931, in 1930, 23,758.

WAVES, *wayz*, disturbances in matter, which result in carrying force from point to point, often to a great distance. The most familiar visible waves are those produced by the wind on the surface of a body of water. Invisible waves are those minute vibrations produced within a body, by striking it or by some other means of agitation. These waves are manifest through their results, as in sound, heat and light.

When waves are produced by the disturbance of a small quantity of liquid, as by throwing a pebble into a pool, they appear

to advance from the point where the pebble strikes, in widening, concentric circles, the height of the wave decreasing gradually as the circle enlarges. There is, however, no progressive motion of the liquid itself, as may be seen by watching a body floating on its surface. This is true of large, as well as small, waves, and the waves of the ocean, which sometimes reach a height of forty feet or more, do not cause the water to move forward. Breakers are caused by the friction of the water on the bottom of the sea, which retards the motion at the wave base and causes the crest to break over it. They never occur in deep water. See **SOUND**.

WAX, a solid, fatty substance derived from animal and vegetable sources. A by-product of petroleum, paraffin, is a similar product, having a number of uses. The chief kinds of animal wax are *beeswax* and *spermaceti*. The first is secreted by bees to build their cells. It is used in the arts for modeling, and in making ointments, plasters and candles. *Spermaceti*, a constituent of whale oil, is used for making toilet creams and candles. A wax secreted by the pores of sheep and extracted from the cut wool is used in dressing leather. Myrtle wax, palm wax and Japanese wax are of vegetable origin. From myrtle wax bayberry candles are made. Vegetable wax is the basis of the finest Japanese lacquers.

WAX MYRTLE, or **WAX TREE**. See **CANDLE-BERRY**.

WAXWING, a handsome singing bird, distinguished by its high, pointed crest, yellow band across the end of the tail and red spots on the wings, which have the appearance of sealing wax. The body plumage is reddish-brown above, yellowish underneath. The cedar waxwing is found in nearly every part of North America,



WAXWING

and may be seen in summer as far north as Southern Alaska. It feeds on insects.

and fruits, and nests in trees. The eggs are putty-colored, with black specks. The *Bohemian wren*, a familiar bird in both eastern and western hemispheres, also migrates to high latitudes in the nesting season, traveling, like the cedars, in small flocks.

WAY BILL. See **BILL OF LADING**.

WAYCROSS, GA., the county seat of Ware County, ninety-seven miles southwest of Satilla River and on the Atlantic Coast Lane, the Waycross & Southern, the Waycross & Western and the Atlanta & Birmingham railroads. It is the center of a fertile section, in which are grown cotton, fruit, live stock, pecans and sugar cane. There is abundant timber, and the city has large saw and planing mills. Other industrial establishments are railway shops, an overall factory, a packing plant, a turpentine plant, a cotton gin, a cold storage plant and a fireproof warehouse for cotton. There are a Federal building, a courthouse, a Y M C A., Kings Daughters' Hospital and Baptist Institute. Population, 1920, 18,068; in 1930, 15,510, a loss of 14 per cent.

WAYNE, wane, ANTHONY (1745-1796), an American revolutionary leader, called "Mad Anthony" Wayne because of his brilliant bayonet charge on Stony Point in 1779, the most daring feat of the Revolutionary War. He was born at Easton, Pa., and was prominent in the patriotic movements before the Revolution. He served in the Pennsylvania legislature and in 1775, when the war broke out, he joined the army, was colonel of a volunteer regiment, and early in 1776 accompanied the expedition to Canada. For some time he was in command of a fort at Ticonderoga, and he afterward took part in the battles of Brandywine, Germantown and Monmouth. He captured Stony Point with a light infantry corps and became a popular idol, this was one of the romantic episodes of the war.

After the surrender of Cornwallis at Yorktown, at which he was present, he served for a time in Georgia and South Carolina. After the close of the war he held a number of civil offices in Pennsylvania and then removed to Georgia. In 1791 and 1792 he represented Georgia in Congress. In 1792 he was made general in chief of the United States army and was given command of an expedition against the Indians in the West. He defeated them at Fallen Timbers in August, 1794, and he concluded with them

the Treaty of Greenville, by which the United States gained a large tract of land.

WEALTH, wealth, a term used in economics to signify all material goods that have value. There are three essential qualities for objects classified as having value, they must be useful, must be limited in supply, and must be transferable. Gold, for example, comes under the category of wealth, for it has utility, it is produced in limited quantity, and it can be taken from one place to another. Health, while it is of priceless value to the possessor, is not wealth, for it is not a material thing. The possession of health is an aid to one who seeks to acquire wealth, but is not wealth itself, according to the terminology of economics. The same statement can be made of intelligence, physical strength, skill, education, and other intangible possessions that are in themselves of great value to man.

Circumstances alter the relative value of objects classified as wealth. On a desert island a shipwrecked sailor with a belt of money would consider food and drink of far greater value than his gold. If he were rescued and taken to a country where food was plentiful his money would be again classified as wealth. The four phases of wealth—production, exchange, distribution and consumption—are fundamental in the consideration of the economic structure of the world.

Related Articles Consult the following titles for additional information	
Capital	Profit Sharing
Consumption	Socialism
Credit	Supply and Demand
Economics	Wages
Money	

WEASEL, weasel, a small, carnivorous animal, a native of almost all the temperate and cold parts of the northern hemisphere. The body is extremely slender, the head small and flattened, the neck long and the legs short. It preys upon mice, birds and other small animals and is very destructive to poultry. The weasel is usually nocturnal in its habits. It is a fine hunter, having a very keen scent and sharp sight, and, being unwearied in pursuit of its victim, it often wears to exhaustion animals larger than itself. Several species are common in the United States, and others are found in most parts of the temperate zones. The *long-tailed*, or *New York*, *weasel* is one of the most familiar species in North America. It is dark brown above and white beneath, and in winter in cold climates

it turns pure white, except for the tip of the tail, which is black.

Related Articles. Consult the following titles for additional information:

Ermine Polecat
Ferret Sable



WEATHER BUREAU,

weather bureau, a government bureau maintained by all civilized countries for the purpose of studying weather conditions and giving useful information thereon to the people. Mark Twain once said, "People have been talking about the weather for years, but nothing has ever been done about it." As a matter of fact, considerable has been done

about it by the weather bureaus. Nobody can ward off a storm sure to be destructive to crops, but the approach of such a storm can be foretold and precautions may be taken to lessen its menace. Warnings of floods, frost predictions, advice on rainfall, recommendations as to irrigation needs—these and many other practical suggestions come from the weather bureaus and help to moderate the tyranny of the weather, which it must be confessed, is a force for good and for ill in the life of nearly every person. The United States Weather Bureau is typical of those of other countries, and in efficiency and in the practical service it renders it is one of the best in the world.

United States Weather Bureau. Previous to the Civil War several attempts to maintain a systematic weather service were made, but on the breaking out of that conflict all these were abandoned. The United States Weather Bureau was organized in 1870 as a division of the signal service in the War Department. The organization was under the supervision of General Albert J. Myer, chief signal officer of the army, and it was adopted by Congress as a national service. Under General Myer's management, *signal stations*, as they were then called, were established throughout the country and were under the direction of a corps of trained weather observers. In 1891 the weather department of the signal service was made a bureau of the Department of Agriculture.

The Weather Bureau is organized into a

number of divisions, each of which carries on its special line of work. The most important of these are the following:

(1) **The Forecast Division**, which receives twice a day reports from stations in the United States, the West Indies, Europe, Asia, Alaska and Hawaii, and makes charts showing the conditions embodied in these reports. These charts are the regular weather maps of the bureau and include forecasts for the entire northern hemisphere. Their predictions are for twenty-four or forty-eight hours.

(2) **The Division of River and Flood Service**, which obtains information concerning the amount of rainfall, ice and snow in the basins of the principal rivers, whether navigable or not. The information which this division gives is for facilitating commerce and especially for protecting river valleys from floods, of which it aims to give ample warning.

(3) **Aviation Service.** Information which is provided especially for airplane pilots has been a most important factor in making travel by air comparatively safe. Local conditions are sent by radio to all fliers, but the Weather Bureau by frequent reports, day and night, keep pilots informed of conditions far ahead on lines of flight. Many of these reporters are also air-line employees.

(4) **The Division of Climate and Crops.** This division maintains a staff of voluntary observers, who give reports of the temperature, rainfall and other important data pertaining to the welfare and growth of crops in different parts of the country. This information is published in weekly and monthly crop bulletins, which are regarded as the highest authority on crop conditions of the country and are of the greatest benefit to agricultural interests.

(5) **Other Divisions.** These include divisions which have charge of examining and testing all instruments used, a division of records and divisions of telegraphy, radio, publications, and supplies.

Observing Stations. There are over 200 regular meteorological stations in the United States. Each of these is in charge of trained observers and is equipped with a full set

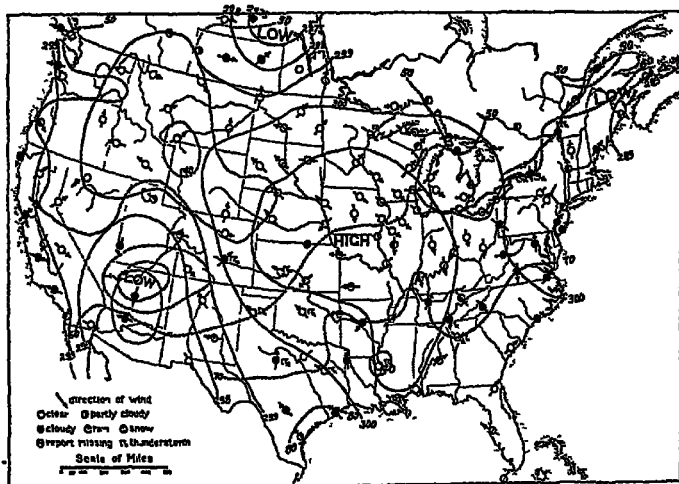


FIG. 1

of instruments. These observations are taken at 7:45 A. M. and 7:45 P. M. Washington time, and the results are telegraphed to the central station of the district and to the office at Washington, from each of which maps are issued and reports transmitted to the country. These stations and numerous

other substations indicate the local weather conditions by the display of signals. A white flag (1 in Fig 1) indicates fair weather. A flag with the upper half white and the lower half blue (2 in Fig 1) indicates local rain or snow. A full blue flag (3 in Fig 1) indicates general rain or snow. A triangular blue flag (4 in Fig. 1) indicates

triangle above indicates storm with wind from the northeast, and with the dark triangle below, storm with a wind from the southeast (see Fig 3). The hurricane warning consists of two red flags with black centers, one above the other (see Fig 4). Forecasts are also displayed in post offices and other public places, and in some sections of



UNITED STATES WEATHER MAP

change of temperature. When placed below another flag it indicates colder, and when placed above, warmer. A white flag with a black square in the center (5 in Fig 1) indicates a cold wave, which means a drop in temperature of from 15° to 20°.

The direction of winds is indicated by triangular flags, which are generally used in connection with storm warnings. The warning flag is red, with a black square in the center. When this is displayed with a triangular white flag above it, it indicates a storm with wind from the northwest. With the white flag below, it indicates a wind from the southwest (see Fig 2). The warning flag with a dark

triangle above indicates storm with wind from the northeast, and with the dark triangle below, storm with a wind from the southeast.

Weather Charts Through telegraphic reports received from all parts of the country



FIG 2



FIG 3



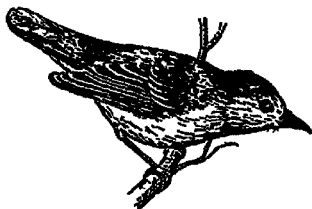
FIG 4

twice each day the United States Weather Bureau constructs, twice daily, weather charts showing areas of high and low barometric pressure, the former generally indicating centers of storm disturbance, the general temperature of the different sections of the country, those of equal temperatures being connected by lines called isotherms.

the direction of winds and the condition of the atmosphere, the latter being denoted as cloudy, partly cloudy or clear, and including presence of rain, snow or thunderstorms. By comparing the map under construction with previous maps and with the latest reports from the various stations, the forecaster is able to tell in what directions the areas of low pressure are moving, and at what speed, and can thus predict, with reasonable certainty, changes of weather in all parts of the country. As to changes in temperature and the velocity and the direction of winds, information furnished by the bureau is almost never far wrong, but so many influences affect the condition of the atmosphere that it is more difficult to predict

entered journalism, as editor of the *Iowa Tribune*, at Des Moines, and became a member of Congress in 1879 and again in 1885. In 1880 he was made the Greenback candidate for President of the United States and in 1892 was the candidate of the People's or Populist party, receiving twenty-two electoral votes.

WEAVER, we' ver, BIRD, a small bird resembling the finch, with pointed wings, a



WEAVER BIRD



SOCIABLE WEAVER BIRD'S NEST

changes in this respect. The weather map shown here is an exact copy of one furnished by the government.

Canadian Bureau. In the Dominion of Canada the Meteorological Service, a division of the Department of Marine and Fisheries, performs the same tasks as the American Weather Bureau. The superintendent of the service has his headquarters at Toronto, Ont., and acts also as director of the Toronto Magnetic Observatory.

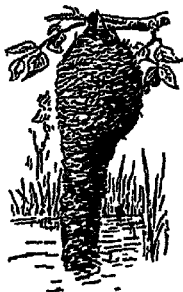
Related Articles. Consult the following titles for additional information:

Climate	Isobars	Rainbow
Cyclone	Isothermal	Snow
Frost	Linen	Storms
Humidity	Meteorology	Tornado
Hurricane	Rain	Wind

WEAVER, we' ver, JAMES HARRD (1833-1912), an American political leader, born at Dayton, Ohio. He graduated from the law school of Ohio University in 1854, served in the Civil War and was brevetted brigadier-general at its close. He removed to Iowa,

sharp, conical bill and unusually long claws. The name has reference to the bird's manner of building its nest, which is a wonderful structure of woven vegetable substances. The form and workmanship of the nests vary with the several species. The yellow weaver, or *baya*, of India, builds a long, bottle-like nest, and hangs it from a slender branch of tree or shrub, often over the water, where it is impossible for anything but a bird to enter. The sociable weaver birds

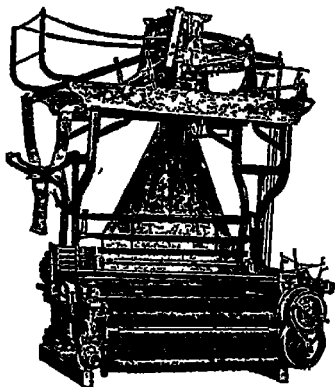
build a large dome-shaped structure, or roof, in the forks of branches, and underneath this common roof many families build their nests, each with a separate entrance. While all members of the community work on the roof, each pair works alone on its own nest. See **BAYA**.



BAYA'S NEST

WEAVING, we' ving, the art of making cloth by means of a loom, from threads or yarn. It is not known when weaving was first practiced, but it is certain that it is one of the earliest of the arts, and it seems probable

that hand looms were invented independently by several of the ancient nations. The Greeks and Romans brought the weaving art to a high degree of perfection. Among modern countries Italy was the first to acquire fame for the manufacture of woollen



JACQUARD LOOM

and cotton cloths. France, England, Germany and the United States later developed extensive weaving industries. Since the fibers of wool are much more easily worked than are those of cotton or flax, woollen cloth has always been made among the more primitive peoples before they attempted fabrics of linen or cotton.

In weaving, two sets of threads are necessary, one running lengthwise of the cloth, and called the *warp*, the other running crosswise, and called the *weft*, or *woof*. The threads of the warp are arranged on the loom by being wound on a yarn beam, at the back, and stretched evenly to the front, where they are fastened to another beam, upon which the cloth is to be wound. In passing from one beam to the other, the warp threads are laid through the *heckles* and also through a comb on the batten. In laying the warp, every other thread passes through one heckle, and the alternate thread passes through the other. The weft is wound upon bobbins, which are placed in the shuttle, by means of which the weft is laid in position. Weaving by hand loom includes the following steps: (1) Pressing a treadle, which is connected with the heckles by a cord that passes over a pulley on the top of the loom. This spreads the

threads of the weft, raising one-half and lowering the others, so that they form an angle called the *shed*. (2) Throwing the shuttle across the warp and thus laying the thread of the weft in position. (3) Striking this thread with the batten, so as to drive it close up against the one previously laid. (4) Springing down the opposite treadle and thus preparing the web for the next thread of the weft.

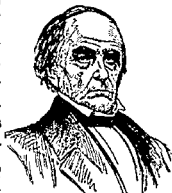
Weaving in these times is almost exclusively done by power looms, operated by steam or electricity. Simple as the hand loom is, it contains the elements of all modern looms. The complexity of the pattern may be increased by placing more than two frames in the heckle and dividing the weft into more parts, also by inventions which raise certain threads in the warp at one time and certain others at another. An invention known as the *Jacquard* loom operates upon this plan. Any number of cords can be used, so that a pattern of any degree of complexity is possible, and since all cords are tied together in the form of an endless chain, the pattern may be repeated indefinitely.

WEBB CITY, Mo., a city in Jasper County, five miles northeast of Joplin, on the Frisco and the Missouri Pacific railroads. It is the center of the zinc and lead mining district of Southwestern Missouri. Mining plants in the vicinity number about two hundred, and there are in addition machine shops, foundries, a cement block factory and a brick and tile plant. The city has a Federal building, a hospital and a public library. It was settled in 1873 and incorporated in 1876. Population, 1920, 7,807, in 1930, 6,876, a loss of 12 per cent.

WEBER, KARL MARIA FRIEDRICH ERNST VON (1786-1826), a German composer, born at Eutin in Holstein. His father was a musician and gave him a good musical education. At the age of fourteen he wrote an opera, and in 1803 he visited Vienna, where he became acquainted with Haydn. He procured a musical directorship in Breslau, on which he entered in 1804, leaving it only to accept, successively, several more important positions. In 1820, at Berlin, he produced *Der Freischütz*, the most celebrated of his compositions. It was performed in London and Paris two years later. In 1822 *Euryanthe* was brought out, and in 1828 Weber visited London to superintend the production of *Oberon*, which he had com-

posed for Covent Garden Theater. Shortly after its enthusiastic reception, the composer died in London. Besides the operas mentioned, Weber wrote a large number of works for the piano, notably the *Invitation to the Dance* and the *E flat major Polonaise*. He was the forerunner, in style, of Wagner, whom he strongly influenced.

WEBSTER, DANIEL (1782-1852), American orator and statesman, born in the township of Salisbury, N. H. His father was a backwoods farmer, who had previously been a hunter and soldier, and Daniel owed his first education to his mother. Later, in the intervals of farm work, he attended village school, and when he had reached the age of fifteen, his father made some generous sacrifices to send him to Dartmouth College, where he remained four years. After studying privately and in a Boston law office, he entered the law in 1804, settled at Portsmouth, N. H., and prospered.



DANIEL WEBSTER

Webster at first took little interest in politics, but in 1812, having already established a commanding reputation, he was elected to Congress by the anti-war party. He was placed on the committee of foreign affairs, and his maiden speech, delivered on June 10, 1813, upon the Berlin and Milan decrees, took the House and country by surprise by its display of rhetorical power and wealth of historical knowledge. His subsequent speeches on the increase of the navy, which he warmly recommended, and the repeal of the embargo, placed him in the first rank of debaters.

In 1816 Webster retired for a time from political life, removing to Boston to devote himself to his profession. For nearly seven years afterward, with a single exception, he filled no public office, but as an advocate and counselor achieved a preëminent position at the American bar. His strongest powers were displayed in arguing points of constitutional law, and his achievements in this direction drew upon him the attention of the whole country. In 1820, on the celebration of the bicentenary of the landing of the Pilgrim Fathers, he delivered an oration which added greatly to his fame as an orator,

and he continued to gain in public esteem through other great addresses, notably those at the laying of the cornerstone of Bunker Hill Monument in 1825 and at the memorial service for Adams and Jefferson in 1826.

In 1822 he was elected to Congress, and was reëlected in 1824 and 1826. At the end of his last term he was chosen Senator for Massachusetts. In January, 1830, he delivered a remarkable speech in favor of the nationalist view of the Constitution, in reply to a speech by Robert Y. Hayne of South Carolina. The address created a sensation throughout the Union and probably was more widely circulated throughout the country than any other in previous American history. Webster was strongly opposed to the nullification movement of Calhoun and the South Carolina school, and his eloquence in support of Jackson's energetic measures did much to prevent secession. In 1836 he was an unsuccessful candidate for the Presidency, and from 1841 to 1843 was Secretary of State under Harrison and Tyler. The chief event of this period was the negotiation of the famous Webster-Ashburton treaty with England, which was equally advantageous and honorable to both parties.

Webster generously supported Clay's candidacy for the Presidency in 1844; and was himself an unsuccessful aspirant for the Whig nomination in 1848. In 1845 he was reëlected to the Senate, and in the struggle over the admission of Texas and California he strongly favored the Northern, or anti-slavery, side. Afterward, however, when public excitement had reached a dangerous height, he supported a policy of compromise, and March 7, 1850, he made a speech in favor of obedience to the Fugitive Slave Law. The same year he was appointed a second time Secretary of State, which office he held till his death.

Webster's guiding principle in politics was the preservation of the Union, for which he was ready to make all sacrifices, opposing the nullifiers, on the one hand, and the abolitionists, on the other. One of his best remembered utterances is that from the *Reply to Hayne*, ending with the exclamation, "Liberty and Union, now and forever, one and inseparable!"

Related Articles. Consult the following titles for additional information:

Calhoun, John C.	Webster-Ashburton
Clay, Henry	Treaty
Nullification	

WEBSTER, HENRY KITCHELL (1875-1932), an American novelist, born at Evanston, Ill., and educated at Hamilton College. After graduation he taught English for a year in Union College and then began the publication of stories that soon gained for him a place as one of the most popular of American story writers. Among the stories that first brought him into prominence were *The Short Lane War*, *Comrade John* and *Columet K*, all written in collaboration with Samuel Merwin. Novels of which he is exclusively the author are *The Story of a Corner in Land*, *Roger Drake*, *The Shy Man*, *The Ghost Girl*, *The Butterfly*, *Real Adventure*, *The Thoroughbred*, *The Painted Scene* and *An American Family*.

WEBSTER, NOAH (1758-1843), an American lexicographer, author of the original *Webster's Dictionary* and of *Webster's Spelling Book*. He was educated at Yale and prepared for the law, but gave it up for teaching. His experience in schools led to the composition of his *Spelling Book*, which was published in 1784, and of which it is said that 62,000,000 copies have been sold. About 1807 he began work upon his *American Dictionary of the English Language*. In preparing this work he visited England and worked for some months at Cambridge. The first edition of the dictionary was finished in 1828, and a second edition was published by Webster in 1840. This work was the basis of the standard *Webster's International Dictionary*.

WEBSTER-ASHBURTON TREATY, a treaty concluded at Washington in 1842 by Daniel Webster, then Secretary of State, and Lord Ashburton, minister of Great Britain to the United States. It defined the northeastern boundary between the United States and Canada, which for years had been a source of irritation between the two countries.

WEDGE, *wey*, one of the so-called mechanical powers used in the construction of machines, formed of a combination of two inclined planes. Wedges of wood or metal are used for splitting various substances or for exerting strong pressure in a small space. The axe, with its thin and its broad edge, is one application of the principle of the wedge. See **MECHANICAL POWERS**.

WEDGWOOD, *wef'wood*, **WARE**, a superior kind of glazed pottery, capable of taking the most brilliant and delicate colors. It is

usually decorated with classic designs, often in relief upon a solid ground. It is used not only for the table, but also for ornament; and, owing to its hardness and property of resisting the action of all corrosive substances, it is commonly used for mortars in laboratories. The ware was named after the inventor, Josiah Wedgwood. See **POTTERY**.

Josiah Wedgwood (1730-1795), one of the greatest of English potters, was born at Burslem, of a family of successful potters. At the age of eleven he began making pottery on a wheel. The loss of a leg compelled him to give up this work, and he afterwards became head of his own pottery works and the most famous of English potters. Wedgwood made many improvements in the manufacture of earthenwares, and all subsequent work in this field has reflected his powerful influence.

WEDNESDAY, *wens'day* (Woden's day), the fourth day of the week.

WEED, THURLLOW (1797-1882), an American journalist, born at Cairo, N. Y. At the age of twelve he began to learn the printer's trade in Catskill, N. Y., and ten years later he was editing. He founded the *Onondaga County Republican*, and in 1824 became editor and owner of the *Rochester Telegraph*. He was elected to the legislature in 1826, and at the close of his second term he established the *Albany Evening Journal*, a Whig paper, which he edited for thirty-three years. During the Civil War, at the instance of President Lincoln, he was sent to Europe on a semi-official mission, and he did much to remove the misapprehensions as to the war, and to induce foreign governments to refrain from interference. In 1867 he became editor of the *New York Commercial Advertiser*, which position he resigned on account of failing health. He was the author of *Letters from Europe and the West Indies* and an *Autobiography*.

WEEDS, a term applied to plants that are out of place—not wanted, and in most cases very troublesome. Many plants when grown and cultivated in gardens, as the goldenrod and the dandelion, are classed as flowers, while the same plants, running wild in uncultivated ground, are considered as weeds. The chief ways in which weeds are injurious are: (1) They increase the labor necessary to cultivate the soil, (2) they take up food from the soil, which should go to useful plants, (3) their foliage smothers the young

plants; (4) they sometimes are poisonous to cattle. Care should be taken to eradicate them as soon as they begin to grow. There are various ways to prevent their growth, different weeds requiring different methods. Planting of pure seed, diligent tillage of the soil, rotation of crops, cultivation of all open land with crops, are some of the means used. Some weeds while young can be destroyed without injury to the crop, by spraying the field with certain chemicals, called *herbicides*. Weeds are often of service to a farmer, in aiding him to know the needs of his land, since many kinds grow only where the conditions are peculiarly adapted to them. See *HERBICIDES*.

Related Articles. On page 517, in the article *Botany*, is a further discussion of the subject of weeds. For descriptions of the common weeds, consult the following titles:

Abutilon	Dandelion	Mullein
Artemisia	Dock	Pigweed
Bindweed	Foxglove	Plantain
Buttercup	Flaxseed	Ragweed
Burdock	Goosefoot	Sand Bur
Canada Thistle	Gromwell	Sow Thistle
Cocklebur	Indian Mallow	Stramonium
Cow Parsnip	Milkweed	Thistle

WEEK, a period of seven days, one of the conventional divisions of time, the origin of which is doubtful. Among the ancient nations who adopted the week as a division of time, are the Chinese, the Hindus, the Egyptians, the Chaldeans, the Jews, the Persians and the Peruvians. In some cases the name has been applied to cycles of time other than that of seven days. The nations with whom the weekly cycle has been traced with certainty to the greatest antiquity are the Egyptians and the Hebrews. The use of the week was introduced into the Roman Empire from Egypt, about the first or second century of the Christian Era, and it had been recognized independently of Christianity before the Emperor Constantine confirmed it by enjoining the observance of the Christian Sabbath.

WEEVIL, *wē'vīl*, the name applied to a group of very small beetles, most of which have long snouts, slightly curved downward. They are very destructive to the products of agriculture, some of them injuring the plants, others ruining the fruit or seed. With the long snout the insects of some species bore into nuts, grain or fruit and eat out the interior. Sometimes they deposit their eggs in the fruit, or seeds, so that the larvae will have food when hatched. In this way weevils often hatch out in meal, flour, rice and such food stuffs, spoiling them.

The *boll weevil*, which attacks the cotton boll, is one of the worst pests in the United States, having caused enormous losses to Southern farmers. It is a grayish weevil one-fourth of an inch long. It lies torpid in winter, and when the cotton comes up feeds on the leaves and blossoms. The eggs are deposited in the cotton boll, which the maggots destroy. There are four or more generations each summer. The *alfalfa weevil* is another species of considerable economic importance, and the United States Department of Agriculture has employed stringent measures to have it checked. Peas and beans are among other crops subject to weevil attack. The insects breed in the growing pod and also in stored beans and peas. When unfested, the beans float in water and should not be planted. See *BOLL WEEVIL*.

WEIGHING, *way'ing*, **SCALE**, a mechanical contrivance for ascertaining the weights of substances. The simplest form of the weighing machine is the balance formerly used by grocers. It consists of a horizontal beam pivoted in the middle and having at one end a deep pan, in which was placed the article to be weighed, and at the other a horizontal disk. Pieces of iron of graduated size and ranging in weight from an ounce or less to several pounds were used on the disk to balance the article to be weighed. A modification of this scale is the unequal beam balance, based on the principle of the lever. The horizontal beam is not pivoted at the middle point, but near one end; the weight to be determined is placed upon the shorter end and is balanced by a much smaller weight at the long end.

The *platform scale* is a typical example. It consists of a hinged platform, set above a stationary platform, which sinks under a weight and presses upon a lever underneath. The lever is connected with a vertical rod attached to the short end of the horizontally-pivoted beam already described. The longer end, or lever, of the beam is marked off in a graduated scale. The article to be weighed is placed on the platform, which sinks under the weight, pressing upon the lever, which conveys the pull to the vertical rod connected with the beam. The weight on the long end of the beam is moved along the scale until it balances with the weight on the platform. The weight of the article on the platform is indicated by the mark in pounds at which the weight balances. A

weight of one pound on the lever may be made to balance with ten, a hundred or even a thousand pounds or more on the platform. Some of these scales are even built to weigh heavy guns and locomotives.

Among the most recent inventions of scales is a complicated device which not only weighs the goods but also computes the price of fractions of a pound.

WEIGHT, wayt, the measure of the force by which any body or a given portion of any substance gravitates or is attracted to the earth; in a more popular sense, the quantity of matter in a body, as estimated by the balance, or expressed numerically with reference to some standard unit. In determining weight in cases where very great precision is desired, due account must be taken of temperature, elevation and latitude. Hence, in fixing exact standards of weights, a particular temperature and pressure of air must be specified, thus the standard brass pound of Great Britain is directed to be used when the Fahrenheit thermometer stands at 62° and the barometer at thirty inches. See, also, GRAVITATION, WEIGHTS AND MEASURES, METRIC SYSTEM.

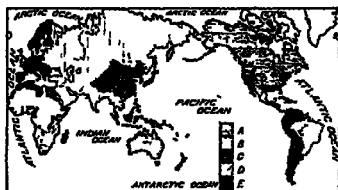
WEIGHTS AND MEASURES, the standards used in measuring quantities. Most of the common standard units have been chosen arbitrarily, though efforts have always been made to have the units conform to some natural rule. Evidences of this fact remain in the names of both ancient and modern units, such as the cubit of the Egyptians and Hebrews, which was the length of the forearm, and the foot of the Greeks, which was the length of a man's foot.

The so-called *English* system of weights and measures, used in the British Empire and the United States, dates from a law passed in 1266 in England, which provided that an English penny should equal in weight 32 wheat corns, taken from the middle of the ear, that 20 pence should make an ounce, 12 ounces a pound, 8 pounds a gallon of wine and 8 gallons of wine a London bushel. Before this time, two pound units had grown up, one, the *Troy* pound, introduced into England by William the Conqueror, weighed considerably less than that before used in England, and its introduction created such dissatisfaction that an average pound of sixteen ounces, now known as the *avoirdupois* pound, was made the standard unit

for articles in common trade, while the *Troy* pound, of twelve ounces, was retained as the unit of weight for gold, silver, gems and apothecaries' supplies.

The units of length, capacity, weight and volume have often varied and are not yet entirely uniform, but the common standards of the English system are as follows: Of length, the *yard*, consisting of 3 feet, each foot containing 12 inches, 5½ yards equal 1 rod, 320 rods equal 1 mile. In England, the rod is called a *pole*, or a *perch*. The units of square and cubic measure are respectively the squares and cubes of the linear units, as *square yard*, *cubic inch*, etc. The *acre*, used in the measurement of land, contains 160 square rods. A *square mile* equals 640 acres.

There are two sets of measures of capacity, one for liquids and one for solids. The unit for liquid measure is the *gallon* of 231



THE WORLD'S WEIGHTS AND MEASURES

Showing the commanding position of the English system

- (A) English weights and measures established and fundamental
- (B) English basis for linear measurements
- (C) Local and English prevail, and are closely identical
- (D) Metric, local and English
- (E) Metric prevails, with mixture of old and English

cubic inches. The quart, one-fourth of a gallon, contains 57.75 cubic inches. The quart is divided into two pints and the pint into four gills. Standard gallon measures are maintained in England, Canada and the United States. The quart in dry measure contains 67.2 cubic inches, eight quarts make one peck and four pecks one bushel. The standard bushel contains 2150.42 cubic inches. The metric system (which see) is used in Europe.

There are numerous terms in use in special occupations, such as the *hand*, a unit used in measuring the height of an animal, and equivalent to about 4 inches; the *fathom* (2 yards), used in measuring the depth of water, the *knot*, or *geographical mile*

(6088.27 feet), used to designate distance at sea; the *chain* (4 rods), used in surveying; the *furlong* (10 chains); a *link* (.01 of a chain); the *ell* (3 $\frac{1}{8}$ feet); the *barrel* (31 $\frac{1}{2}$ gallons); the *hogshead* (2 barrels). In England the barrel equals 36 gallons.

Making and keeping standards of the different units, weights and measures is in the hands of the governments of the respective nations. The work requires the greatest skill and care. In the United States these standards are prepared and kept by the United States National Bureau of Standards. In 1856 the British government sent to the United States two standards of length, which are still preserved. The same year the Treasury Department sent a complete set of weights and measures to the governor of each state. These sets are kept at the capitals of the respective states, and may be used for testing weights or measures whose accuracy is in doubt. Most states appoint inspectors whose duty it is to see that false weights and measures are not used by tradesmen.

Related Articles. Consult the following titles for additional information:

Acre	Furlong	Mile
Apothecaries' Weight	Gallon	Ohm
avoirdupois	Gram	Ounce
Barrel	Hogshead	Pound
Bushel	Kilogram	Quart
Carat	Kilogrammeter	Seruple
Centimeter	Kilometer	Ton
Chain	Kilowatt	Troy Weight
Cubic Measure	Knot	Volt
Drachma	League	Watt
Fathom	Liter	Weighing
Foot	Mensuration	Scale
	Meter	

WEIMAR, *vi'mahr*, GERMANY, a quaint old city on the River Ilm, about fifty miles west-southwest of Leipzig, in the former grand duchy of Saxe-Weimar. The place is associated in a peculiarly interesting way with the new and with the old Germany. Here, in February, 1919, the first national assembly of the German republic met to establish a government based on democracy; here, in July of the same year, the Treaty of Versailles was ratified.

Weimar is famous, too, for its association with the classical epoch of German literature, and it has been called the "German Athens." Goethe, Schiller, Wieland and Herder lived here, and Goethe and Schiller are buried in the cemetery in the southern part of the town. Goethe's house is now the Goethe National Museum, and Schiller's house is also the property of the city and is open to the public. The Goethe-Schiller mon-

ument in bronze is in front of the famous court theater, in which the national assembly held its memorable sessions. Another striking building is the grand ducal palace, which was partially constructed under the supervision of Goethe. Weimar has an excellent school system, including an art school, an industrial school, a music school and other special schools. Stoves, straw hats, leather and cloth are manufactured, and the book trade is considerable. Population, 1933, 51,675.

WELD'ING, the process of uniting two pieces of a substance when softened by heat. In the arts the term is restricted to splicing such metals as iron and platinum, though glass and several other substances can be welded as readily as these metals. The simplest method of welding iron is that employed in the ordinary blacksmith shop. The smith hammers the ends of the bars to be welded into a wedgelike form, and heats them white hot, and just as they begin to soften, he covers them with borax or some other flux, to prevent the formation of oxide. The hot ends are then laid together and hammered, the soft surfaces unite, and the joint formed is usually as strong as any other portion of the bar. In most manufactures, electricity is now very generally used for welding, a current of sufficient power to heat and soften the metals being employed.

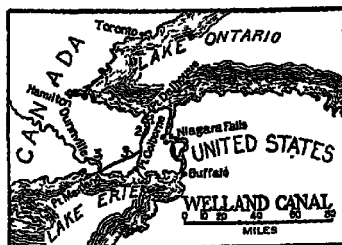
WELFARE ISLAND, formerly Blackwell's Island, in East River, New York City.

WELLAND, Ont., the county town of Welland County, on the Welland Canal and on the Canadian National, the Michigan Central, the Wabash, the Pere Marquette, the Canadian Pacific and other railways. Welland has become a railroad and manufacturing center. Especially important are iron and steel products of various kinds, agricultural implements, cordage, cotton goods, chemicals, stoves, tires, concrete and furniture. There is an abundance of water power and natural gas in the vicinity. Welland has a wireless station, two government docks, a court house, a registry office and a park. Population, 1931, 10,709.

WEL'LAND CANAL, a canal on the Canadian side of the Niagara River, connecting lakes Erie and Ontario, and constituting an important link in the chain of canals extending from Lake Superior to Montreal. It was opened in 1833 and in 1871 was considerably enlarged. It is 26 $\frac{3}{4}$ miles long, 160 feet wide and fifteen feet deep.

The growth of commercial transportation on the great lakes, and the increased size of ships, taxed the capacity of this, the only canal connection between the upper lakes and the ocean. As early as 1913 engineers reported a plan for a new and larger canal which would utilize in part the waterway of the old. The work was begun on the new canal, called the Welland Ship Canal, and was finally completed in 1930. The Ship Canal follows closely the old canal for about half its length, to Allanburg, and then follows a new and straighter course roughly parallel to the old, but east of it, entering Lake Ontario at Port Weller, about three miles east of Port Dalhousie. The total distance from lake to lake is 25 miles. The difference in level between the two lakes, 325½ feet, is overcome by seven lift locks, each having a lift of 46½ feet. Each lock is 800 feet long, 80 feet wide in the clear, and has a depth of 30 feet over the sills. The width of the Ship Canal at the water line is 310 feet, at the bottom 200 feet, and its depth is 25 feet.

The value and importance of such a waterway to the agricultural and industrial development of Canada and the United States can hardly be overstated.



WELLAND CANAL

1, New Canal, 2, Old Canal, 3, Feeders

The cost of these improvements exceeded \$125,000,000.

WELL BORING, a method of sinking wells of small diameter, for the purpose of obtaining water, petroleum or natural gas, or for discovering veins of ore.

Well boring is most frequently done by steam power. The machinery consists of a derrick, shaped like a square pyramid, about twenty feet across at the base and from seventy to seventy-five feet high, an engine for operating the machinery, a windlass for raising and lowering the drill, a walking

beam, and bits and drills of different sizes and styles. The drill is attached to a rope, which runs over a pulley at the top of the derrick and down to a drum on the windlass. A few feet above the surface, this rope is grasped by a clamp, which is attached to a screw, called the *temper screw*, used to regulate the motion of the drill. The drill is attached to one end of the walking beam, which is operated by the engine and works the drill forcibly up and down. A rotary motion is given the drill by the operator's turning the handle slightly at every stroke. When the drill has descended the length of the temper screw, it is drawn out by the windlass. If the well is dry, water is run into it, and a bucket, called the *sandpiper*, is lowered, to draw out the mud and crushed rock. This bucket is a hollow cylinder, about sixteen feet long, with a bottom that opens upward. As it descends, the bottom opens and allows the cylinder to be filled. When the cylinder is drawn out, the weight of the mud closes the valve, and in this way the well is emptied. As fast as the hole is drilled, it is cased with a steel tube. Bored wells in the oil regions vary in size from five inches to eight inches in diameter. Artesian well bores are usually smaller.

Wells may be bored as deep as 4,000 or 5,000 feet. Difficulty in well boring increases with the depth, and deep wells are very expensive. See **ARTESIAN WELL**, **PETROLEUM**.

WELLES, wels, GIDEON (1802-1878), an American statesman, born at Glastonbury, Conn. He attended Norwich University, and on leaving there became editor of the *Hartford Times*. He was a member of the state legislature from 1827 to 1835, in the latter year becoming state comptroller. From 1846 to 1849 he was chief of the bureau of supplies of the United States navy. He joined the Republican party soon after its organization, and in 1861 was made Secretary of the Navy by President Lincoln. In this post he displayed remarkable executive ability, managing the navy with consummate skill and efficiency during the war. He also served throughout Johnson's administration. In 1872 he supported the Liberal Republican movement, and in 1876 he used his influence for Samuel J. Tilden.

WELLESLEY, wels'ly, RICHARD COLLEY WELLESLEY, Marquis (1760-1842), a British general and statesman, brother of the Duke of Wellington. He was educated at Harrow, Eton and Oxford and in 1784 entered

the English House of Commons. In 1797 he was made governor-general of India, and for his suppression of the insurrection of Tippu Sahib of Mysore, and for the capture of Seringapatam, he was made Marquis Wellesley in the Irish peerage. He was also successful in the struggle with the Mahrattas in 1803-1805. His administration in India, which ended in 1805, was one of the most important in the history of British rule there, owing to his financial reforms and his military victories. In 1808, Wellesley was made minister to Spain, and in the following year he became secretary of state for foreign affairs. He was chosen prime minister in 1812, but was unsuccessful in his attempts to form a cabinet. From 1821 to 1828 and from 1830 to 1834 he was lord lieutenant of Ireland.

WELLESLEY COLLEGE, an institution for the higher education of women, founded in 1875 at Wellesley, Mass. The courses are largely elective and lead to the degrees of Bachelor of Arts and Master of Arts. The college is a contributor to the American Schools of Classical Study at Rome and Athens, to the zoölogical station at Naples and to the marine biological laboratory at Wood's Hole, Mass. The faculty includes about 175 instructors; the attendance is about 1,600, and the library contains about 99,000 volumes.

Henry Fowle Durant (1822-1881), the founder of Wellesley College, was born at Hanover, N. H., and educated at Harvard. After completing a law course he engaged in practice in Boston. Subsequently he became a layman preacher. Durant contributed between \$1,000,000 and \$2,000,000 to Wellesley College.

WELLINGTON, ARTHUR WELLESLEY, Duke of (1769-1852), a British general and statesman, the hero of the Battle of Waterloo. He was the son of the Earl of Mornington, and was educated at Eton, at Brighton and finally at the Military College of Angers, in France. In 1787 he received a commission as ensign in the army, and after a rapid series of changes and promotions, he attained, by 1796, the rank of colonel. During 1794 and 1795 he served with his regiment under the Duke of York in Flanders, and in 1797 his regiment was dispatched to Bengal. War had just been declared against Tippu Sahib, and Colonel Wellesley's regiment had an important part in the Battle of Malavelly and

the storming of Seringapatam. After this he was appointed to the administration of Mysore, and in 1803 he was given the command of a force engaged in a war against the Mahrattas. His successes compelled the submission of the Mahrattas, and peace was restored on conditions drawn up by the successful general.

In 1805 Wellesley returned to England, was shortly afterward elected to Parliament for Rye and in 1807 was appointed secretary of state for Ireland. In August, 1807, he received the command of a division in the expedition to Copenhagen, and he directed the only land operation of importance. In 1808 he attained the rank of lieutenant-general and received the command of a force destined to operate in the north of Spain and Portugal. He was subsequently superseded; but before giving up the command he gained the Battle of Vimeiro over Junot, the campaign being brought to a close with the Convention of Cintra, by which the French agreed to evacuate Portugal. In 1809 Wellesley was appointed to take the chief command in the peninsula, which had been overrun by the French. The passage of the Douro, and the defeat of Soult, which followed, fittingly opened this masterly campaign. For the victory at Talavera (July 28), the first of many which he won in the peninsula, the government raised Wellesley to the peerage, as Viscount Wellington.

Toward the end of 1810 he fought the Battle of Busaco, which was followed by the famous fortification and defense of the lines of Torres Vedras. Before these fortifications the French encamped for months, but they were finally compelled, by lack of supplies, to evacuate Portugal. A little later (in 1811) occurred the victory of Fuentes de Onoro. Early in 1812 Wellington took Ciudad Rodrigo and Badajoz by storm, fought the Battle of Salamanca, accounted one of his most famous victories, and in August entered Madrid. For his brilliant conduct of the campaign, he received the thanks of Parliament and was raised to the dignity



DUKE OF
WELLINGTON

of marquis. Next followed the Battle of Vittoria (1813), battles in the Pyrenees, the capture of San Sebastian and the forced retreat of Soult.

In 1814 a victory over Soult was gained, and in the same year the Battle of Toulouse, in which Soult's best troops were routed, opened the way for the British troops to the heart of France. Napoleon abdicated on April 12, and a few days later the war was brought to a close by the signing of conventions with Soult and Berthier. The triumphant general was created Marquis of Douro and Duke of Wellington and was given the thanks of both houses of Parliament. In July he went as ambassador to France and succeeded Lord Castlereagh as British representative in the Congress of Vienna, and when Napoleon returned, Wellington took command of the army assembled in the Netherlands to oppose him, winning the great victory of Waterloo. On his return to England, after the restoration of peace, he accepted the post of master-general of the ordnance, with a seat in the cabinet of Lord Liverpool. In 1822 he represented Great Britain in the Congress of Verona, and six years later he accepted the premiership, resigning the command of the forces to Lord Hill. The growing discontent throughout the country on the subject of Parliamentary reform, which Wellington steadily opposed, caused the resignation of the government in 1830. He held office under Sir Robert Peel as secretary of state, and in 1846 he helped to carry the repeal of the corn laws, which till then he had opposed. He died September 14, 1852, and was buried in Saint Paul's Cathedral. See WATERLOO, BATTLE OF.

WELLINGTON, NEW ZEALAND, the capital of the dominion of New Zealand, a seaport situated on Port Nicholson, on North Island, 1,280 miles southeast of Sydney, the nearest Australian port. It has a fine harbor and an extensive export and import trade. Manufacturing establishments include flour mills, saw mills, tanneries, foundries, soap and candle works, brick kilns, etc. Important buildings are a government building, a museum, buildings of Victoria University College, and the Wellington branch of the New Zealand Institute. Population, 1931, with suburbs, 138,510.

WELLS, HERBERT GEORGE (1866-), one of the most forceful and original of the modern group of English novelists. He was

born at Bromley, Kent, of middle-class parents, and was educated at London University. After teaching for several years he began writing for magazines, and in 1895 produced a fantastic romance called *The Time Machine*, which met with instantaneous success. Other stories of a like character followed, including *The War of the Worlds*, *When the Sleeper Wakes* and *In the Days of the Comet*. In another series of novels of everyday life he finds opportunities to set forth his belief in Socialism, as in *The Research Magnificent* and *The Passionate Friends*. *Tono-Bungay* is much admired for its excellent character drawing, and *History of Mr Polly* for its naive humor. In *Mr Britling Sees It Through* Wells produced one of the outstanding books based on the World War. In 1921 appeared *Rusina in the Shadows* and *The Outline of History*, followed by *The Science of Life* and other volumes.

WELSBACH, vels'bach, **BURNER**, an incandescent gas burner composed of a cone-shaped cotton-gauze mantle of oxides of thorium and cerium. When first lighted the cotton burns away, leaving a skeleton of the oxides. By means of this burner a strong, clear light is obtained with the use of a minimum amount of gas, smoke and unsteadiness of the flame being eliminated.

Karl Welsbach (1858-1929), inventor of the Welsbach burner, a native of Austria and pupil of Bunsen at the University of Heidelberg. He is the discoverer of the rare elements praseodymium, neodymium and lutetium.

WELWITSCHIA, wel'wich'e a, a remarkable plant, growing in the dry regions of southern Africa. It consists of a stem, which forms a woody mass, rising not more than a foot above the ground and having a diameter of from four inches to as many feet. From this mass grow two enormous leaves, which become dry and are often split up into shreds, but which do not fall off. Every year several short flower stalks grow up from the base of these leaves, but no other leaves are ever produced.

WENTWORTH, went'worth, **THOMAS**, Earl of Strafford. See STRAFFORD, THOMAS. **WENTWORTH, Earl of**

WESLEY, wes'li, the family name of two brothers famous as the founders of the religious sect from which the Methodist Church developed. John Wesley, the elder, was the leader of the movement.

John Wesley (1703-1791) was born at Epworth, Lincoln, June 17, 1703, a son of the village rector. His mother was a woman of intelligence and piety. The boy attended the Charter-House School and later Christ Church, Oxford, from which he was graduated in 1724. A year after his graduation he was ordained to the ministry, and for a time acted as his father's curate. When in 1729 he returned to Oxford he became associated with his brother Charles and a few other undergraduates in what was derisively called the "Holy Club."

In 1735 he and his brother Charles went with General Oglethorpe to America and for three years the brothers did missionary work among the Indians. John Wesley's preaching was not particularly successful, but the trip marked the turning point in his life, for on the journey over he made the acquaintance of some Moravian Brethren whose simple piety made a deep impression on him. On returning to London he sought the Brethren, and from Peter Bohler, one of their preachers, learned the doctrine of "saving faith." In the summer of 1738 he visited the Moravian leaders on the continent, and this experience confirmed him in his new faith in the saving power of Christ. Returning to England he became associated with George Whitefield, and his real life work as an evangelistic preacher began.

His new methods aroused much opposition, and churches were closed to him. He then began preaching in the open air, gaining a large number of followers. In 1740 an important step was taken when Wesley organized his first society and appointed lay preachers, who were communicants of the Church of England, to take charge of small groups of converts. The small meetings thus provided for caused the movement to spread rapidly. In 1711 the first conference of lay preachers was held. These remained members of the Established Church, it was not until 1781 that Wesley's organization became a new denomination, separate from the Church of England. Wesley was a prodigious worker, traveling long distances and preaching three or four times a day. At the same time he produced a large volume of religious literature. In 1750 he was married to Mr. Vassell, a widow with four children, but incompatibility soon led to a separation. At the time of his death Wesley's followers numbered 120,000.

A man of much charm of personality, kindly wit and humor, Wesley was admired even by those who opposed his doctrines. He retained his sprightliness and interest in all about him to the last. See METHODISTS.

Charles Wesley (1707-1788), a noted English evangelist, brother of John Wesley, aided his brother in founding the Methodist Church. He was born in Epworth, England, and was educated at Westminster School and at Christ Church, Oxford. In 1735 he went with his brother John to America and preached in the Georgia colony. His preaching was not successful, owing to his extreme views; and in 1738, influenced by his brother, he modified his doctrines and methods and became an itinerant preacher. He then began to attract large audiences. His chief service to the Methodist movement, however, was as a writer of hymns. He produced about 6,000, some of which remain favorites in the denomination.

WESLEYAN METHODISTS, an offshoot of the original Methodist Church, which preserved the form of church government originated by John Wesley. It is chiefly represented in the British Isles. The other important branch of the denomination, distributed chiefly in America, early adopted the Episcopal form of church organization and became known as the Methodist Episcopal Church. The Wesleyan Methodists joined the United Methodist Church (which see) in 1932.

WEST, BENJAMIN (1738-1820), an American painter, who made his way up from humble beginnings to a place of highest distinction in the world of his day. Painting and drawing he taught himself, making his colors of leaves and berries and his brushes of hair from his cat's tail. At the age of eighteen he established himself as a portrait painter in Philadelphia. In 1760 he went to Rome, where his *Omon* and *Iphigenia* and *Angelica* and *Medora* received favorable comment. Three years later he went to England; and so cordial was his reception that he decided to make London his home. For King George III, his patron for more than thirty years, he executed a series of historical and religious paintings for Windsor Castle. On the death of Sir Joshua Reynolds, in 1792, he became president of the Royal Academy. The best of his historical paintings are *The Death of General Wolfe*, *Penn's Treaty with the Indians*, *The Battle of La Hogue* and *The Black Prince at Poitiers*. Among his re-

higious pieces, the most notable is *Christ Healing the Sick*. Though not a great genius, West was a talented and painstaking painter, and is given credit for improvements he made in the manner of treating historical subjects.

WEST CHESTER, PA., the county seat of Chester County, twenty miles west of Philadelphia, on the Pennsylvania and the Philadelphia, Baltimore & Wilmington railroads. It is surrounded by an agricultural region, and large cream separator works and extensive nurseries are the most notable industries. The city is the seat of the West Chester State Normal School, one of the largest normal schools in the country, and of Darlington Seminary for young ladies and Saint Anthony's Boys' College. The Battle of the Brandywine was fought within four miles of West Chester, and the battlefields of Chadd's Ford and Valley Forge are within driving distance. The Old Turk's Head Hotel dates from pre-Revolutionary days. Population, 1920, 11,717; in 1930, 12,325, a gain of 6 per cent.

WESTERN AUSTRALIA, a state of the Australian Commonwealth, occupying all of that portion of the continent west of the 129th meridian, east longitude. Its greatest extent from north to south is 1,480 miles, and from east to west, 1,000 miles. The area is estimated at 975,920 square miles, making it the largest of the Australian states. In this vast region there are less than three inhabitants to the square mile, as the population in 1933 (official census) was only 438,948. No other state of the Commonwealth is so sparsely populated.

The interior is a low plateau, varying in altitude from 700 to 1,000 feet and occasionally rising to greater height. It is mostly sterile, with little or no vegetation. Most of the eastern part of this division belongs to the great Victorian Desert. The western coast line is bordered by highlands or mountains, which are from 50 to 100 miles from the coast. These mountains also extend into the northern or Kimberley division. They are low, and their highest summits do not exceed 3,580 feet. The productive regions of the colony are in the west and southwest. Here there is sufficient rainfall to sustain vegetation, and extensive forests of eucalyptus, sandalwood and other Australian trees occur.

The lands are also well suited to grazing and agriculture, and wheat, barley, corn, oats,

potatoes and hay are raised in paying quantities. Apples, peaches, oranges, lemons, grapes and other fruits are also cultivated. Considerable live stock is raised and wool growing is an important branch of agricultural industry. Other resources of the state are timber, and mineral wealth, consisting largely of gold.

The government is similar to that of other Australian states. The governor is appointed by the British sovereign and the legislature consists of a legislative council of thirty members and an assembly of fifty members. The members of the council are chosen for six years, and of the assembly, for three years. Women vote on equal terms with men. Perth is the capital, with its port, Fremantle, its population is 208,000. See AUSTRALIA.

WESTERN RESERVE. In 1786, when Connecticut ceded to the United States government the western lands covered by its original charter of 1662, it retained a strip of land extending westward from the Pennsylvania boundary 120 miles, and called it the Western Reserve. Most of this tract was sold in 1795 and 1796 to the Connecticut Land Company, and the sum paid (\$1,200,000) was used for Connecticut public schools. The new company surveyed the land, and settlers began to take homesteads and to develop it. Later the district became a part of the state of Ohio. The name of the reservation disappeared from geography, but survives in a university at Cleveland, which is situated in the district (see below).

WESTERN RESERVE UNIVERSITY, a nonsectarian institution of higher learning, founded in 1826. It is located in Cleveland, Ohio, where it occupies a beautiful parklike campus covering thirty-six acres. The following departments are maintained: Adelbert College; Men's College; the College for Women; the Library School; the School of Applied Social Sciences, schools of dentistry and pharmacy, the Department of Graduate Instruction, graduate schools of law and medicine, the School of Education, and the summer session. The library contains 180,000 bound volumes. Including the summer school enrollment, the student body numbers about 9,000. There are about 565 members on the faculty.

WESTFIELD, Mass., a town in Hampden County surrounded by the picturesque Berkshire Hills, is nine miles west of Springfield, on the Westfield River and on the Boston &

Albany and the New York, New Haven & Hartford railroads. There is an airport. The city manufactures heating apparatus, bicycles, motorcycles, auto trailers, celluloid products, gas pumps, envelopes, paper, knit goods, textile machinery, and cutlery. A state normal school is located here, and the town has a Federal building, a hospital and a public library. Westfield was settled in 1642, and was known by the Indian name of Woronoco until its incorporation in 1669. There is mayor-council government. Population, 1920, 18,604; in 1930, 19,775.

WEST INDIES, *in'diz*, or ANTILLES, *an til' leez*, an archipelago lying between North America and South America, and between the Gulf of Mexico and Caribbean Sea on the west and the Atlantic on the east. The islands cover a total area of about 92,000 square miles, while their surface area comprises only about 300 square miles. They are believed to be the summits of a subterranean mountain chain. Most of them are high above sea level. The climate is tropical. Cuba, the largest island of the group, is independent; Santo Domingo and Haiti, both on the same island, are self-governed states sometimes depending on financial guidance of the United States. The other islands are colonial possessions, distributed among the several governments as follows:

Great Britain: Bahamas, Jamaica, Caymans, Virgin Gorda, Tortola, Anegada, Sombrero, Anguilla, Barbuda, Saint Christopher (Saint Kitts), Antigua, Nevis and Redonda, Montserrat, Dominica, Saint Lucia, Saint Vincent, Barbados, Grenada and the Grenadines, Tobago, Trinidad.

United States: Porto Rico, Saint Thomas, Saint John, Santa Cruz (Saint Croix), the last three purchased in 1917 from Denmark and now called the Virgin Islands.

France: Martinique; Guadeloupe, Désirade, Saint Martin (in part), Marie Galance, Saint Bartholomew, Les Saintes.

Netherlands: Saint Martin (in part), Saint Eustatius, Saba, Curaçao, Aruba, Buen Ayre.

Venezuela: Margarita, Tortuga, Hermanos.

Independent: Cuba and Isle of Pines, Haiti. The large islands and different groups are described under their respective titles.

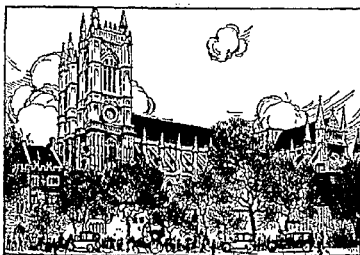
Related Articles. Consult the following titles for additional information:

Bahama Islands	Porto Rico
Barbados	Saint Christopher
Cuba	Santo Domingo
Dominica	Travels in Distant
Guadeloupe	Lands
Haiti	Trinidad
Jamaica	Virgin Islands
Leeward Islands	Windward Islands
Martinique	

WEST INDIES, DANISH. See VIRGIN ISLANDS OF THE UNITED STATES.

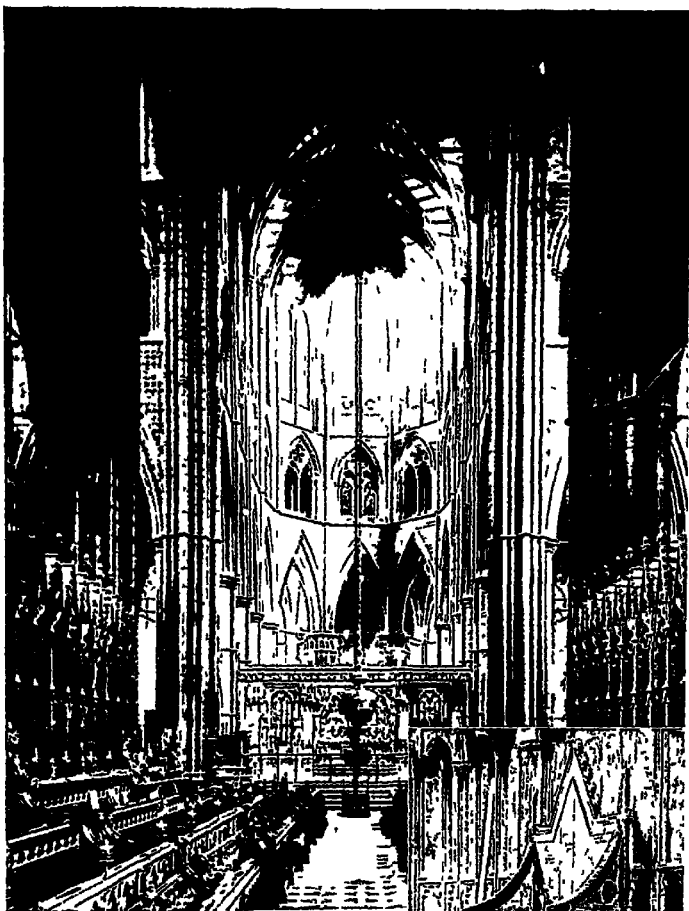
WESTINGHOUSE, GEORGE (1846-1914), an American inventor and engineer, the inventor of the air brake. He was born in Schoharie County, N. Y., and was educated in the public schools of Schenectady. He spent much time in his father's machine shop and invented, when but fifteen years of age, a rotary engine. During 1863 and 1864 he served in the Union army, and later he studied in Union College. His inventions include a device for replacing railroad cars on the track; the air brake, which he invented in 1868 and subsequently improved, and a number of signaling devices. Alternating current machinery was introduced in America largely through his efforts. He built the great generators at Niagara Falls and those for the elevated railway and the rapid transit system in New York, and he established in Europe and in the United States large works for the manufacture of air brakes and other machines. See AIR BRAKE.

WESTMINSTER ABBEY, a famous church in London, called "Abbey" because up to the time of Henry VIII it was a Benedictine monastery, presided over by an abbot. It is situated near the Thames, adjoining the Houses of Parliament. In 1065 a church was built on the site, in the Norman style, by



WESTMINSTER ABBEY

Edward the Confessor, but the main building, as it now stands, was begun in 1220 by Henry III and was practically completed by Edward I. Various additions were made down to the time of Henry VII, who built the chapel which bears his name. The upper parts of the two towers were designed by Sir Christopher Wren. The extreme length of the church is 423 feet, the roof is 102 feet high, and the towers are 225 feet. The coronation

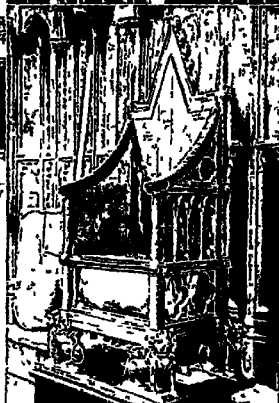


Ewing Gallery

THE CHOIR OF WESTMINSTER ABBEY

THE CORONATION CHAIR

The oaken chair made to order of Edward I, to hold the famous "stone of destiny," on which the kings of Scotland had been crowned for centuries. The kings of England sit in this chair when crowned.



of English kings takes place in the choir of Westminster Abbey, where the coronation stone brought by Edward I from Scotland, is placed beside the coronation chairs of the English sovereigns.

Burial in the Abbey is one of the greatest honors the nation can bestow, and not only sovereigns but some of the most celebrated men of science, soldiers, statesmen and men of letters are interred there. Some of the great men who have not been buried there are honored with tablets or portrait busts. In the *Poet's Corner* are monuments to most of England's great poets, from Chaucer to Robert Browning, and a memorial to Longfellow, the only American who is represented.

WESTMINSTER HALL, the hall of the old palace of Westminster, erected by Richard II on the foundations of a structure built by William Rufus. It is 290 feet long, sixty-eight feet wide and ninety feet high, and it has a fine porch, and a roof of carved timber which is considered the most notable of its kind. This building is closely associated with many stirring events in English history. Here Chancellor More, Lady Jane Grey, the Earl of Strafford, King Charles I and Warren Hastings were brought to trial. The hall was the center of the highest English courts of law until these were removed to the new buildings recently erected for their accommodation. It escaped the fire of 1834, and to-day serves as a vestibule to the Houses of Parliament.

WEST ORANGE, N J See **ORANGE**

WESTPHALIA, *wes't fā' lā*, a small province of Prussia, mountainous as to its surface, rich in iron, coal, zinc and copper. The iron and coal areas are extensions of the great Ruhr mines. Westphalia leads all Germany in coal. There is also a large stone and salt industry. Plants for the manufacture of metal wares and machinery abound. Westphalia also manufactures quantities of linen, woolen and cotton goods. About forty per cent of the area is under cultivation, producing crops of rye, oats, flax, potatoes and wheat. Münster is the principal city of the province.

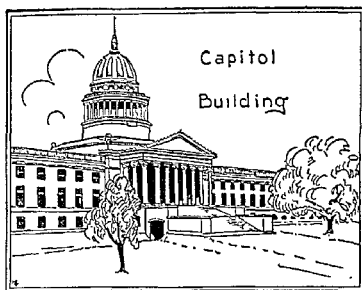
Westphalia was retained as a part of Prussia in the formation of the new Republic of Germany. In 1923, France occupied the Ruhr district in this province, in an attempt to secure from Germany reparation payments guaranteed by treaty.

WESTPHALIA, PEACE OF, the treaty which closed the Thirty Years' War. Many states had been involved in this contest and two separate conventions were held to decide upon terms of peace. The representatives of the Empire, France and Spain and the Catholic electors and princes of the Empire met at Münster, and the representatives of Sweden, the Empire and the German Protestants at Osnabrück. Each of these conventions signed a treaty in 1648 and in October of that year the general treaty was signed at Westphalia, by the representatives of all the powers.

One of the important provisions of the treaty was the extension to the Calvinists of the religious liberty which had by the Peace of Augsburg been allowed only to the Lutherans. It was provided, also, that all territory which, in the Palatinate, Württemberg and Baden in 1618 and in the other states in 1624, had been held by Catholics, was to remain Catholic, and that all which at that time had been held by Protestants was to remain Protestant. A prince might make his religion compulsory with his subjects, but the latter had the right to emigrate if dissatisfied. The Upper Palatinate was added to the duchy of Bavaria, the Lower Palatinate was given to the son of the Elector Palatine, and Western Pomerania was ceded to Sweden. Brandenburg received certain cessions of territory to make up for the loss of Pomerania, France was given Alsace, with Metz, Toul and Verdun, Spain recognized the independence of the United Provinces of the Netherlands, and Austria recognized the independence of Switzerland. See **THIRTY YEARS' WAR**.

WEST POINT, N Y, a village in Orange County, on the west bank of the Hudson, fifty-five miles north of New York City, at the opening of the Highlands. The village is beautifully situated on an elevated plateau and is chiefly noted as the seat of the United States Military Academy, which occupies a site covering 2,300 acres (see **MILITARY ACADEMY, UNITED STATES**).

In the early history of the country West Point was of considerable strategic importance, and during the Revolution it was fortified under the direction of the Polish engineer Kosciuszko. It was given into the command of Benedict Arnold (see **ARNOLD, BENEDICT**), who treacherously attempted to surrender it to the British. It was selected as the site of the academy by Congress in 1802.



WEST VIRGINIA, a state in the eastern mountainous region of the American Union, lying west of Virginia, of which it was originally a part. It is irregularly oval in shape, with extensions on the north and northeast, hence its early popular name, the "Panhandle State." It is now called the "Mountain State." West Virginia is one of the foremost mining states, ranking next to Pennsylvania in value of mineral output.

Location and Size. The state has no seacoast. Its northern boundary adjoins the frontiers of Ohio, Pennsylvania and Maryland, and its curving southern boundary follows the Kentucky and Virginia borders. Ohio and Kentucky are on the west. With an area of 24,282 square miles, West Virginia is the fortieth state in size, being about 6,800 square miles smaller than South Carolina, the state next larger in area. It is almost exactly half the size of Louisiana, and about twice as large as Maryland, the forty-first state.

People and Cities. West Virginia has a remarkably high percentage of native-born inhabitants, the proportion of foreign born being less than five per cent. The total population in 1920 was 1,463,701. By the Federal census of 1930, the population was 1,729,205, making the state twenty-sixth in rank. The average density per square mile was 72. There were more than 115,000 of negro blood, and of the foreign groups the most numerous were Italians, Poles, Hungarians, English, Germans, Czechoslovakians, Greeks, Jugoslavs, and Austrians, in the order named.

The Methodists are the largest religious sect. Others of importance include the Baptists, Roman Catholics, Presbyterians, Disciples of Christ and Lutherans.

According to the Federal census for 1930

there were in the state that year ten cities with populations exceeding 10,000. The first five, in order of size, with 1930 figures, are Huntington (75,572), Wheeling (61,659), Charleston, the capital (60,408), Parkersburg (29,623), and Clarksburg (28,866).

Surface and Drainage. The surface as a whole is very uneven and in the eastern portion it is mountainous. The mountain region occupies more than one-third of the state, and the ranges extend in a northeast-southwest direction. Between the mountain ranges on the eastern and western sides are broad valleys, narrowing into ravines as they approach the hill region. The ridges in the eastern part are cut by numerous transverse valleys, and in the southern part these valleys are so numerous as to cut the mountain ranges into broad domes with spurs running in various directions, leaving but few definite ridges. The average elevation of the state, 1,500 feet, is the highest average of any state east of the Mississippi River. The highest point is Spruce Knob, in Pendleton County, which has an elevation of 4,860 feet, and the lowest point is Harper's Ferry, with an elevation of 260 feet. Some of the other prominent peaks are Bald Knob, 4,800 feet, and High Knob, 4,170 feet. West of the mountains there is a belt of broad, flat hills, ranging from 1,000 to 2,000 feet in elevation. These hills are followed by a more gently rolling country, sloping toward the Ohio River.

The Ohio River furnishes steam navigation along the whole western boundary and receives all the principal streams of the state, except the Potomac and its affluents: The largest rivers flowing into the Ohio are the Guyandotte, the Kanawha, the Little Kanawha, the Big Sandy and the Monongahela. The Potomac's South Branch drains the northeastern section of the State.

Climate. The climate has seasonable variations ranging from 30° below to 100° above zero, the mean average temperature of the state being 56° F. The average rainfall in the highest elevation is 35 inches, in the lowest 55 inches, and for the state 43 inches.

Mineral Resources. Coal, natural gas and petroleum are the most valuable mineral products of this richly-endowed commonwealth. Possessing 17,280 square miles of coal area, West Virginia surpasses Pennsylvania in extent of deposits, though the latter state has a larger annual yield. The production in West Virginia has been steadily



increasing for many years, and now approximates 140,000,000 tons annually, wholly of bituminous coal

West Virginia is one of the leading states in the production of natural gas, its output in recent years has had a value of over \$70,000,000. Much of this output has been used in the production of gasoline. The annual yield of petroleum averages above 6,000,000 barrels. Among the state's other valuable natural products are clays, glass sand, marble, sandstone, limestone and salt. The total annual value of all its mineral products ranges from \$300,000,000 to \$400,000,000. The state's water power is not highly developed.

Agriculture Considering its mountainous surface West Virginia ranks well as an agricultural state, about one-third of the whole land area is improved. The Ohio and the northeastern valleys are especially fertile. Corn is grown generally, and leads all other crops in acreage, production and value. The annual harvest is about 10,000,000 bushels. Other important crops are wheat, hay, oats, potatoes, buckwheat and rye. Sorghum cane also receives considerable attention, and fruits thrive in various sections, especially in the panhandle regions. Apples, including

the prized Grimes' Golden and Golden Delicious varieties, are the most important orchard crop, and peaches are second. Market gardening, stock raising and dairying are all profitable lines of farm activity.

Manufacturing West Virginia has many natural advantages conducive to the development of manufacturing, such as an abundance of fuel, water power and good transportation facilities. It ranks high among the states in the manufacture of lumber and lumber products, its most important manufacturing industry. Wheeling, the principal manufacturing city, is the center of the iron and steel interests, representing the second largest industry. The state is first in the production of lampblack, one of the first ten in the production of tanned leather articles, second in the output of galvanized iron, third in that of coke, and second in that of tin plate and terneplate. At Wheeling and other cities there are extensive glass factories, and at Charleston there is one of the largest ax factories in the world. Oil refining, pottery making and the manufacture of tobacco products are also carried on.

Charities and Corrections The charitable and correctional institutions include the

Items of Interest on West Virginia

One of the provisions of the state constitution makes it illegal for the commonwealth to contract debts. The state has a bonded debt, however, of over \$70,000,000.

The important railway systems entering the state include the Pennsylvania, the Baltimore & Ohio, the Chesapeake & Ohio, the Norfolk & Western, the New York Central and Western Maryland.

The Ohio and its tributaries provide some of the cheapest means of transporting coal in the world.

West Virginia assumed its share of the old state debt when it separated from Virginia, but the amount for which the state was liable was not definitely decided upon until 1915, when the United States Supreme Court placed the state's liability at \$12,397,929, with interest reckoned at \$3,178,000.

There are no lakes in the state, and the water area, 148 square miles, is smaller than the water surface of most of the states.

The large tonnage of coal, timber, and ores makes transportation of freight a profitable business, most of which is handled by the railroads, though large sums of money have been spent by the Federal government and by the state to improve river navigation.

All children between the ages of six and twenty-one are entitled to free education in the public schools, and all children between the ages of eight and fourteen are required to attend school at least twenty weeks each year.

Questions on West Virginia

What is the general shape of West Virginia?

What is its area? Population?

What is the character of the surface?

What rivers drain the state?

How does West Virginia rank in the production of coal? Petroleum? Natural Gas? Coke?

What is Blennerhassett and why is it famous?

Weston State Hospital, the Spencer State Hospital, the Huntington State Hospital, the State Tuberculosis Sanatorium, the Welch State Hospital, No 1, McKendree Hospital, No 2, the Fairmont Hospital, No 3, the West Virginia Industrial School for Boys, the West Virginia Industrial Home for Girls, the West Virginia School for the Deaf and Blind, and the West Virginia Children's Home.

Transportation. The state secures water communication through the Ohio, the Monongahela, and the Kanawha, which are navigable for large boats. Lumber was formerly floated down the Little Kanawha, the Big Sandy, as well as down the Ohio, which was used extensively to transport coal. Several trunk lines of railway traverse the state from east to west, one in the northern, another in the central and two in the southern section. Two lines extend north and south, connecting these in several places, and there are numerous cross-lines and spurs, so that the northern and central parts of the state are well supplied with railway facilities.

Government. The legislature consists of a senate and a house of delegates, the former having thirty members, and the latter, ninety-four. One-half of the senators are elected every two years, for a four-year term, and the delegates are elected for two years. The legislature meets biennially, and the session is limited to forty-five days. The executive department consists of a governor, a secretary of state, a superintendent of free schools, a treasurer, an attorney-general and a commissioner of agriculture, each elected for four years. The courts consist of one supreme court of appeals, twenty-two circuit courts and thirty-eight courts of limited jurisdiction, together with courts of county commissioners, justices of the peace and city courts.

Education. Separate schools are maintained for white and colored pupils. The system of public instruction is in charge of a superintendent of free schools, and school attendance is compulsory for children between the ages of eight and fourteen. High school education is under the direction of a special supervisor. The higher institutions of learning include the West Virginia University, at Morgantown; the state teachers colleges at Athens, Fairmont, Glenville, Huntington, Shepherdstown and West Liberty; Bethany College, West Virginia.

Wesleyan College, Buckhannon, Morris Harvey College, Barboursville, a normal school at Bluefield, for Negroes

History The state of West Virginia was, until 1863, a part of the state of Virginia. (For early history, see VIRGINIA, subhead *History*) At the outbreak of the Civil War, many of the counties in the western part of that state had Union sympathies, while the remainder wished to secede and join the Confederacy. Therefore, in June, 1861, representatives of forty counties declared independence of the state of Virginia reorganized the government of Virginia on a loyal basis under Francis H. Pierpont, representatives to Congress were elected and a constitution was adopted in April, 1862. Meantime, a "reorganized" provisional government of Virginia had given its consent to the formation of the state, and West Virginia was formally admitted June 20, 1863. It was the scene of some of the earliest fighting in the Civil War, and furnished far more than its quota to the Federal armies. After the war there was rapid development of the resources of the state and a great increase in population. It was Democratic in politics from 1872 to 1892, and although generally Republican since that time, it went Democratic in the Presidential election of 1932.

Related Articles Consult the following titles for additional information

	CITIES
Bluefield	Huntington
Charleston	Martinsburg
Clarksburg	Morgantown
Fairmont	Parkersburg
Harper's Ferry	Wheeling
	MOUNTAINS AND RIVERS
Alleghany	Monongahela
Blue Ridge	Ohio
Cumberland	Potomac
Kanawha	

WEST VIRGINIA UNIVERSITY, a co-educational state university, established at Morgantown in 1868, by the consolidation of the West Virginia Agricultural College, Woodburn Seminary and Monongahela Academy. It includes colleges of arts and sciences, engineering and mechanic arts, agriculture, medicine and law, schools of music, military science and tactics, and commerce. In 1928 a women's gymnasium was completed, also a field house for men, at a cost of \$550,000. There are 300 instructors and about 3,000 students, including those in special departments and in the summer schools.

WEYLER, *way'ler*, **NICOLAU VALERIANO**, Marquis of Tenerife (1838-1930), a Spanish

general and administrator, born at Palma, Majorca. He received a military education in Spain, and was a military attaché of the Spanish legation in the United States at the time of the Civil War. He fought in Cuba under Balmaceda, from 1868 to 1878, and later in Spain against the Carlists. Afterwards he was successively governor of the Canary and the Balearic islands, and in 1889 he became captain-general of the Philippines. After later service as provincial governor of Catalonia, Spain, he became, in 1896, Spanish governor of Cuba. His administration there was marked by such harshness and cruelty that the United States protested, and in 1897 he was recalled. After the Spanish-American War he was for a time captain-general of Madrid.

WEYMAN, *wi'man*, or *way'man*, **STANLEY JOHN** (1855-1928), an English novelist, born at Ludlow, Shropshire, and educated at Oxford. He was admitted to the bar in 1881 and practiced for eight years. His first historical romance, *The House of the Wolf*, is a story of the French occupation of Quebec. *A Gentleman of France* established his reputation in the field of historical romance, it has been translated into many languages. Among his other novels which have brought him wide popularity are *Under the Red Robe*, *My Lady Rotha*, *The Red Cockade*, *The Man in Black*, *The Castle Inn* and *The Wild Geese*.

WHALE, a large marine animal, some species of which are the largest animals in existence. Though often classed as a fish, the whale bears only a superficial resemblance to the fishes. The tapering body terminating in a finlike tail and the fin-shaped paddle on



WHALE

each side of the body are the only points of similarity, while the dissimilarities are numerous and fundamental.

The whale, first of all, is a mammal, bearing its young alive, and suckling it in infancy. It has well-developed brain and lungs, and warm blood, which circulates through veins

and arteries. Its bones, joints and muscles are like those of the higher land mammals. The forelimbs contain the same bones as do those of other mammals. These are proportionately short, and, instead of toes, there is a paddle, about seven feet long, formed by a continuous skin; while in the rear part of the body are rudimentary bones which indicate the existence of hind legs in remote ancestors. The organ of locomotion is the fin-shaped tail, which is also used for purposes of defense. The whale is a timid creature and becomes combative only when attacked. When aroused it can capsize a large vessel with its tail, which is from five to six feet long and twenty to twenty-five feet broad, and destroy smaller craft by ramming it with its blunt nose.

Two distinguishing characteristics of whales are the proportionately large head, which is usually a third of the entire length of the body, and the thick layer of fat beneath the skin, which protects the animal from the cold. This fat, called blubber, is cut from the captured animal and reduced to oil. Before mineral oils came into general use, whale oil was burned in lamps in every part of the world.

The eyes of whales are small and there is usually only one nostril, frequently S-shaped, situated on top of the head. It is closed by a pluglike valve, opened only by pressure from inside. When the whale comes to the surface it expels the air from its lungs with great force through this nostril; and the hot, moisture-laden breath condensing in the cold air produces a column of vapor several yards high. The notion that a whale takes water into its mouth and blows it out through this hole is erroneous. The whale's mouth is large, but the throat is very small; however, a species known as the Greenland whale has a throat large enough to admit a man's body.

Whales usually are divided into two classes—the whalebone whales and those having teeth. The toothless whales are commercially the more important, and are hunted for both oil and whalebone, which latter is taken from the animal's mouth. The roof of the mouth is provided with vertical horny plates, called *baleen*, about 500 in number. These plates hang from the roof of the mouth in a fringe ten or twelve feet long. This equipment serves as a sieve for straining out the minute animals on which these whales

feed. The surface waters of the ocean teem with animal life, and whales in feeding swim with open mouth at high speed near the surface, traveling in this way until hunger is satisfied. The manufacture of cheap substitutes for whalebone has greatly decreased the commercial importance of whalebone whales.

The toothed whales are the larger, attaining a length of ninety feet and a weight of seventy tons. The young when born are from ten to fourteen feet long. Of these the sperm whale is the most valuable. The blubber produces sperm oil, while the oil of the head yields spermaceti, used in making candles and cosmetics. Another valuable product of this whale is *ambergris*, found in the intestines and used in making perfumes.

Before the middle of the eighteenth century whaling was an important industry, but since the discovery of petroleum it has rapidly declined. Modern whaling operations are conducted with swift vessels, and the whales are killed by harpoons shot from guns. On every coast where whale fishing is conducted there are stations along the shore to which the carcasses are towed and cut up and prepared for market.

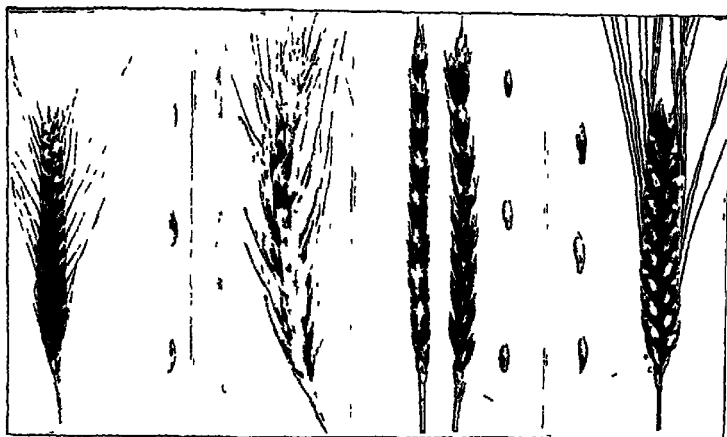
Related Articles. Consult the following titles for additional information, as well as the article Mammal:

Ambergris	Cetacea	Sperm Whale
Blubber	Spermaceti	Whalebone

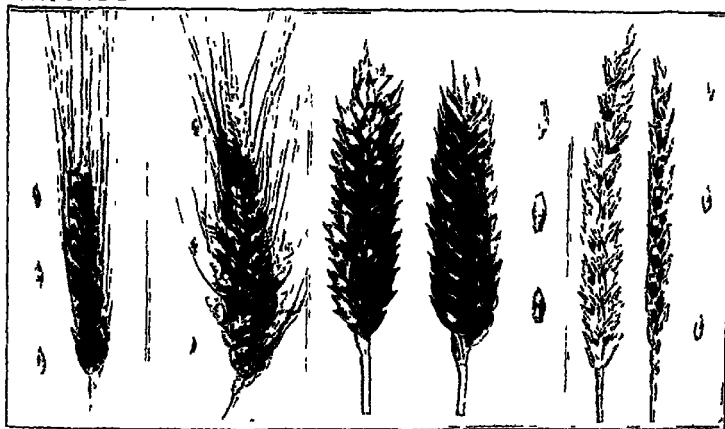
WHALEBONE, *hwal'e'bone*, or **BALEEN**, a term applied to the horny plates attached to the palate of the toothless whale. They are arranged in a double row on the upper jaw and hang down parallel into the cavity of the mouth. The length of the plates varies from a few inches to twelve feet, and in number there are about 200 on each side of the mouth. The color varies according to the species, some kinds being black, some yellowish-white and others gray, striped with black or black and white.

This whale has no teeth, and this fringe of bony plates serves as a sieve or strainer of the animal's food which it takes in through wide jaws while traveling at high speed. From its strength, lightness and flexibility, whalebone has become an important article of commerce, being used for many purposes, as in the manufacture of corsets, ribs for umbrellas, whips and surgical instruments, though in some of these uses it has been largely superseded by steel.

WHARTON, EDITH (1862-), whose maiden name was EDITH NEWBOLD JONES,



Courtesy U S D A



Courtesy, U S D A

EIGHT KINDS OF WHEAT

Above Eankorn, Polish, white spring spelt, white spring emmer Below Arnautka durum, Alaska poulard, little club, red life They are classed in various species and sub-species At right bearded and beardless heads



is one of the most important of contemporary novelists. She was born in New York City, was privately educated, and in 1885 married Edward Wharton of Boston. She early achieved distinction as a short-story writer and in 1899 published her first novel, *The Greater Inclination*, a study in human motives. *The Touchstone*, her second novel, showed a distinct advance in the author's power of psychological analysis, a quality for which she is chiefly distinguished. With *The House of Mirth*, in 1906, she reached the height of her artistic achievement. Also notable are *The Valley of Decision*, *The Fruit of the Trees*, *Tales of Men and Ghosts*, *In Morocco* and *The Age of Innocence*.

With the exception of *Ethan Frome* and one or two others, Mrs. Wharton's stories all are of the literary and artistic world and of the world of fashion. Important books not mentioned above are *The Reef*, *The Custom of the Country*, *Italian Villas and Their Gardens* and *Mother's Recompense*. During the Great War she engaged in Red Cross work in France and received two decorations. As a result of this experience she wrote *Fighting France*, and edited *The Book of the Homeless*, a book prepared and sold for the benefit of the Belgian refugees. Among later books are *Twilight Sleep*, *The Children*, *Certain People*, *A Backward Glance*.

WHEAT, one of the most valuable and widely-known cereal crops, has constituted the staple food of civilized nations for countless centuries. It grows readily in all climates, except the hottest parts of tropical regions and the extreme cold portions of the frigid zones. However, it is best adapted to the temperate regions, and within these regions the greater part of the world's crop is produced. It requires a rich clay soil or heavy loam, and clear, bright days while it is ripening.

Wheat is supposed to be a native of Western Asia, but it has been cultivated so many centuries that the place of its origin is not fully known. It was introduced into North America in the sixteenth century.

Varieties In accordance with their method of growth wheats are divided into *bearded* wheat and *bald* wheat. The first has glumes attached to the seeds, while the second has none. In regard to the color of the kernel, the varieties are divided into *light-colored* and *dark-colored*, or *white* and *red* wheats. Classified according to the time of planting

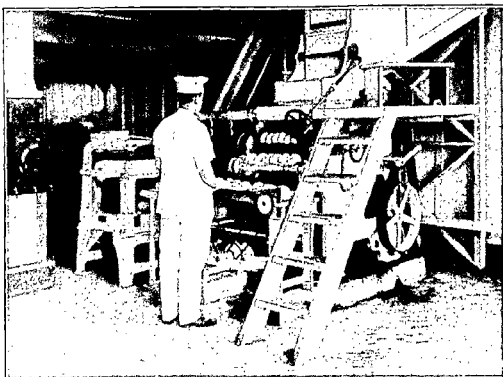
all wheats are grouped under *winter* wheat and *spring* wheat. In each of these classes we find hard and soft wheats. The winter wheat is planted in the fall and is harvested early the following summer. It is well suited to warm temperate climates that have mild winters. The spring wheat is planted early in spring and matures the same season. It is adapted to the short season of the cool temperate regions. It is usually a hard wheat and of better quality than any of the varieties of winter wheat.

Production The United States is the leading wheat-producing country in the world, and the raising of this grain is carried on in Minnesota, North Dakota, South Dakota, Kansas, Oklahoma and some other states on an extensive scale. The wheat farms or ranches are large, some of them embracing more than 25,000 acres. These are divided into sections, each of which has its stables for teams, sheds for storing machinery, and other buildings, and each is under the direction of a foreman. In the spring-wheat region the land is plowed in the fall, and the wheat is planted as early in the spring as the condition of the ground will admit. In the winter-wheat section the ground is plowed as soon as possible after the crop has been harvested. The time of planting depends upon the location. In the warmest regions it is later than in the cool portions of the winter wheat belt.

The work of planting and harvesting is done by machinery. The land is prepared by plows, sometimes by gang plows, which on the largest farms are drawn by tractors. The seed is planted by drills, or sowing machines, and the grain is harvested by self-binding harvesters and thrashed by machines operated by steam engines of such capacity as to thrash from 1,200 to 1,500 bushels in a day (see **THRASHING MACHINE**).

The wheat is hauled directly from the thrasher to the local elevators or to cars for shipment. From the local elevators it is transported to the great wheat centers, such as Minneapolis, Duluth, Chicago and Buffalo, where it is stored in large elevators, some of which have a capacity of 6,000,000 bushels, there it is kept until needed for use.

The average production in the United States is about 880,000,000 bushels a year, though in 1915 the crop was 1,025,801,000 bushels. The leading states in the production of winter wheat are Kansas, Ohio, Oklahoma,



© Underwood & Underwood

When the dough has "risen" it is dumped down a chute to the shaping machine, which cuts the dough, puts it into the pans, and pats it into shape. In many cities there are laws to regulate the size of loaves of bread, so this machine cuts off just enough of the dough to give a loaf, when baked, of the correct weight.

A peep into an automat bakery. When the noon hour comes some millions of persons rush—and rush is the word—for food. About fifty-seven varieties of "quick lunch" must be ready on the dot, for the race, the second name of which is "Hustle," can't waste much time in eating. They demand quick action. They get it. To keep hungry America good-natured the baker must be on the job both day and night.

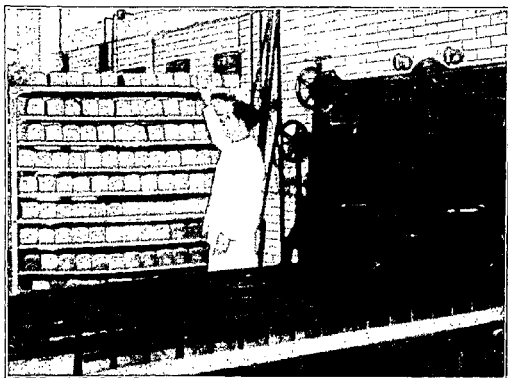
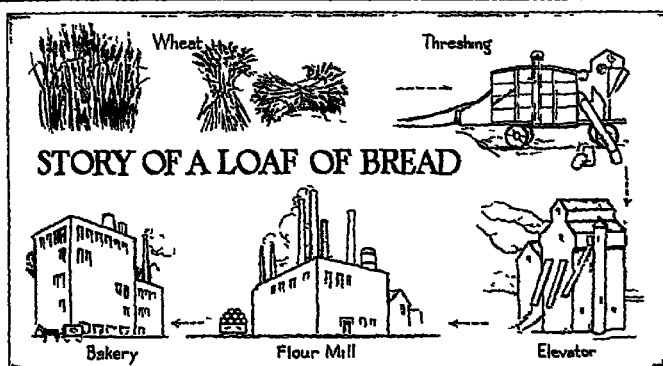


Photo from Underwood & Underwood



Photo from Keystone View Co., Inc.

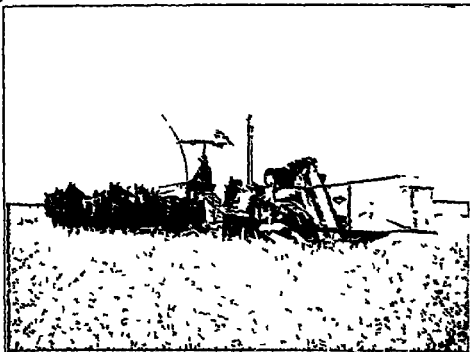
How many thousands of loaves of bread do you suppose the people of New York or Montreal eat every day? In hotels, restaurants, and homes wheat bread merits its title, "The Staff of Life." Without machinery the bakers never could keep up with the appetites of busy Americans. The boast of many bakeries, "No hands have touched your bread," is true. This machine wraps the loaves.



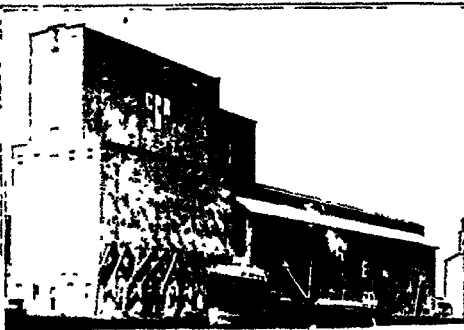
Courtesy International Harvester Co

Tractor and gang plow preparing the soil for wheat. Wheat is the vital element in the world's food supply. In the first thirty years of the twentieth century the number of wheat eaters increased enormously. But the increased acreage devoted to wheat and the use of modern machinery have more than kept pace with the world's consumption needs. To restore the equilibrium measures have been taken to curtail production and to improve methods of distribution.

The latest type of header, a machine which reaps, threshes, and sacks the grain from forty acres in one day. The story of the development of the reaper is full of interest. Read about Cyrus McCormick and the Reaping Machine. The inventors of agricultural machinery have done more than all governments to stimulate the very rapid increase in the world's population which has taken place in the past one hundred years.



Courtesy International Harvester Co



Great wheat elevators at Fort William, Ont. The faster wheat can be loaded and unloaded the more voyages a vessel can make in a year. How does this help to make bread cheaper? What is the capacity of the world's largest elevator? Read article, "Port Arthur, Ont." One hundred thousand bushels of wheat can be loaded automatically in four hours. The steamer can then go direct to Liverpool or Manchester and be unloaded by great suction pipes in about the same time.

Photo from Key Stone News Co

In early times wheat was ground into flour by hand or by horse power, and this is still done in eastern countries. What a slow and laborious process it must be to get flour as this man is doing. Note the path made as the horse walks around and around. Try to imagine our waiting for bread from flour made this way!



Photo from Key Stone News Co

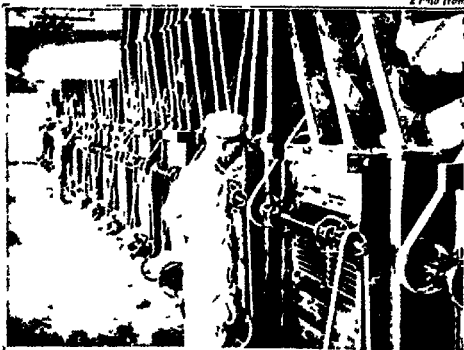


Photo from Key Stone News Co

The purifying room in a big flour mill in Minneapolis, the flour capital of the world. From the time the wheat reaches the top of the mill on an endless conveyor, and passes down on belts and through tubes from floor to floor, until, as barreled flour, it is rolled out into freight cars at the bottom, every effort is made to have the flour absolutely clean, for it may travel into the tropics and be kept a year or more before being made into bread. It must have good "keeping" qualities.



A stand of breaks where the wheat grains are broken up into the first coarse flour, to be later refined and purified. The whole process of flour making represents the triumph of machinery over hands. Every step is automatic and carefully planned for the doing of the most work in the least time with the smallest use of power.

Sacking and weighing with automatic machines in a Minneapolis mill. The machines are set so that they let down into the container (sack or barrel) only the correct amount of flour, by weight. Endless belts move the tied sacks quickly to storage rooms or to freight cars. These men have no chance to go to sleep on the job. The machines don't wait for anyone.



© Underwood & Underwood



Photo from Keystone View Co., Inc.

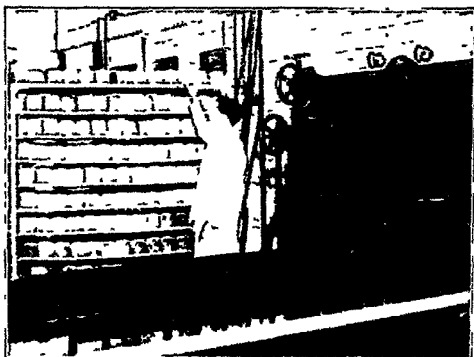
Now we come to the last, or the next to last, great stage of the journey from wheat farm to your table. In the modern bakery, also, machinery does the work. A dough-kneading machine. The dough is now being run into a trough to "rise." All the bread materials, flour, yeast, water, "cream," salt, are weighed carefully and put into the machine from the floor above.



When the dough has "risen" it is dumped down a chute to the shaping machine, which cuts the dough, puts it into the pans, and pats it into shape. In many cities there are laws to regulate the size of loaves of bread, so this machine cuts off just enough of the dough to give a loaf, when baked, of the correct weight.

Get Dough in Shape

A peep into an automatic bakery. When the noon hour comes some millions of persons rush—and rush is the word—for food. About fifty-seven varieties of "quick lunch" must be ready on the dot, for the race, the second name of which is "Hustle," can't waste much time in eating. They demand quick action. They get it. To keep hungry America food-natured the baker must be on the job both day and night.



Flats from Underwood & Underwood



For better service to

How many thousands of loaves of bread do you suppose the people of New York or Montreal eat every day? In hotels, restaurants, and homes wheat bread merits its title, "The Staff of Life." Without machinery the bakers never could keep up with the appetites of busy Americans. The boast of many bakers, "No hands have touched your bread," is true. This machine wraps the loaves.

demand upon the United States for wheat exceeded its supply for exportation. The Food Administration restricted the sale of wheat flour in 1918 and ordered wheatless days in hotels, restaurants and homes. To encourage an increased production of wheat, the government guaranteed the farmers a price of \$2.26 a bushel for the years 1918 and 1919. Canada, Argentina and other countries were also drawn upon for the wheat they could spare for export. White wheat bread contains more nourishment per pound than any other article of food, with the exception of beans, and the scarcity of wheat caused by the war gave every one a slight idea of what a calamity a failure of the wheat crop might bring upon the race.

Uses. The greatest part of the wheat crop is manufactured into flour (which see). By-products of this manufacture include *bran*, *shorts* and *middlings*. Middlings are used extensively in the manufacture of breakfast foods, and bran and shorts are used for feed for stock. Large quantities of starch are also made from wheat. The straw is used for fodder, for bedding in stables, and in the manufacture of straw board and the cheaper grades of wrapping paper.

Wheat Insects. Among the enemies of wheat, those most dreaded are the chinch bug, the Hessian fly and the wheat midge, a small, yellowish insect, with a dark back, related to the Hessian fly, but differing in habits. The wheat midge, which is now common in the Mississippi Valley, probably came from Europe and has occasioned a great deal of damage to wheat, especially in warm and moist seasons. The damage is done by the little orange-yellow larvae, which destroy the embryos of the grain and prevent the heads from filling. As the larvae can live for several months without either moisture or food, they are carried about in the wheat heads, and so the species is distributed. The chinch bug and Hessian fly are described under their titles.

WHEATSTONE, CHARLES, SIR (1802-1875), an English scientist and inventor. Early in life he began the business of making musical instruments, and in his study of the scientific principle involving their construction he made important discoveries in physics. In 1834 he was appointed professor of experimental physics in King's College, London, and there he made important experiments in electricity and, in collaboration with

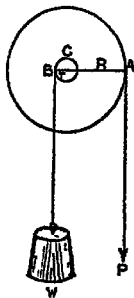
an investigator named Cooke, devised an electric telegraph. From this apparatus developed the system of electric telegraphs used in England until 1870. Wheatstone was also the inventor of several other electric appliances, one of which enabled a system of clocks to be regulated from a central clock, by means of electro-magnets.

WHEEL, an instrument of torture, employed by the Greeks and Romans and later in Western Europe. "Breaking on the wheel" was instituted in France in 1534 and was abolished in 1789. Assassins, highwaymen, incendiaries and pillagers of churches were of the classes so punished. There were several modes of wheel torture. Sometimes the victim's bones were broken, and his body was then bent around a wheel, bound and left until death ensued, perhaps in twenty-four hours. To terminate sooner the victim's sufferings the executioner sometimes dealt him two or three heavy blows, called *coups de grace* (mercy strokes), on the chest or stomach.

WHEEL. See TRANSPORTATION.

WHEEL AND AXLE, a continuous lever of the first class (see LEVER), consisting of a wheel and axle, fastened

to the same axis. The radius of the wheel is the power arm, and the radius of the axle, the weight arm, of the lever. The law of equilibrium is that the power multiplied by the radius of the wheel is equal to the weight multiplied by the radius of the axle. In the figure, A represents the circumference of the wheel, C is the circumference of the axle, R the radius of the wheel, and r the radius of the axle. If the wheel has a diameter of three feet, and the axle has a radius of one foot, a power of one pound will balance a weight of three pounds. In making the computations, the same results are obtained, whether the radius of the wheel is compared with the radius of the axle, or the diameter of the wheel with the diameter of the axle. The most common use of the wheel and axle is in the windlass, for raising water. Here the crank often takes the place of the wheel, but the device operates on the same principle.



Combinations of the wheel and axle in which toothed wheels mesh into one another and are driven by a crank or an endless band, occur in machinery where great power is required. Derricks and the shears used for cutting iron bars and plates afford good illustrations of these combinations.

WHEELER, BENJAMIN IDE (1854-1927), an American educator, born at Randolph, Mass. He was educated at Colby Academy and Brown University and spent four years of study in the universities of Leipzig, Heidelberg, Jena and Berlin. He taught in the Providence High School, Brown University and Harvard and in 1886 became a professor in Cornell University, holding, successively, the chairs of comparative philology and Greek.



BENJAMIN IDE
WHEELER

From 1899 to 1919 he was president of the University of California. His written works include *Analogy and the Scope of its Application in Language*, *Introduction to the Study of the History of Language* and *Principles of Language Growth*.

WHEELER, JOSEPH (1836-1906), an American soldier, born at Augusta, Ga. He was educated at the West Point Military academy, was appointed lieutenant of cavalry and served in New Mexico. When the Civil War broke out he joined the Confederate army. He was rapidly promoted, attaining the rank of lieutenant-general. He took part in the Battle of Shiloh, rendered distinguished service at Chickamauga and impeded Sherman on his march through Georgia and South Carolina. After the war he settled in Alabama, and in 1880 he was sent to Congress. He represented his district until 1898, when he reentered the United States army as major-general of volunteers to the great delight of all America, with command of the



JOSEPH WHEELER

cavalry in the Army of Santiago. He rendered valiant service in the battles of Las Guasimas and San Juan Hill, and he was senior member of the commission which arranged for the surrender of Santiago. Later he served in the Philippines, until he was retired in 1900.

WHEELER, WILLIAM ALMON (1819-1887), an American statesman, born at Malone, Franklin County, N. Y. He studied for a time at the University of Vermont, studied law in his native town and was admitted to the bar. Later he engaged in banking. He was a member of the state legislature for two terms, and in 1860 he was sent to Congress, where he served continuously until 1877. He was nominated for the Vice-Presidency by the Republican party in 1876 and was elected with President Hayes. He returned to Malone at the expiration of his term in 1881. Wheeler rendered invaluable service to his country during reconstruction days by his conciliatory attitude as chairman of the committee on Southern affairs.

WHEELING, W. VA., the first city of the state, county seat of Ohio County, sixty-three miles southwest of Pittsburgh, Pa., on the Ohio River and on the Pennsylvania, the Baltimore & Ohio and the Wheeling & Lake Erie railroads. One ward of the city is built on Zane's Island in the river, the island being connected with the main part of the city by bridges, one of them a suspension bridge more than 1,000 feet long. There is water commerce in iron ore, produce, fruit, cattle and poultry. The main manufactures are steel, glass and tobacco products. The city has one of the largest electric power plants in the world. A unique feature is the Market-Auditorium, which combines an up-to-date market and a convention hall. There are a Federal building, a courthouse, a public library and four hospitals. Educational institutions include the Linsly Institute for boys and the Mount de Chantel School for girls. A normal school and Bethany College are not far distant.

Wheeling was settled by Ebenezer Zane in 1770, and was the first town on the Ohio River. It was incorporated in 1806, and was chartered as a city in 1836. Fort Henry was built here in 1774. The people of Virginia who were opposed to secession met here in 1861 at the Wheeling Convention and established "the restored government of Virginia." The Constitutional Convention of

West Virginia also met in Wheeling, and the city was the state capital from 1863 to 1870 and from 1875 to 1885. The commission form of government was adopted in 1917. Population, 1920, 56,208, in 1930, 61,659, a gain of 9.7 per cent.

WHIG, in English history, the name formerly applied to the political party advocating changes in the constitution in the direction of democracy. The term is of Scottish origin, but was early brought to England, where it was used as the name of the political party opposed to the *Tories*, or government party. The term *Liberals* is now generally applied to the representatives of the party formerly known as *Whigs*.

The Whig party in the United States opposed the Democratic party from about 1835 to 1856, when the Northern wing of the Whigs was merged in the new Republican party. See **POLITICAL PARTIES IN THE UNITED STATES**.

WHIPPOORWILL, a North American bird of the goatsucker family. The name is an imitation of the bird's peculiar call of three shrill notes ending in a rising inflection.



WHIP-POOR-WILL

This weird cry is repeated many times in close succession. The whippoorwill makes its home in the midst of thick woods, rarely visiting the haunts of men. It is active at night, feeding on night insects, which it catches on the wing. During the day it sits lengthwise on a limb, where, owing to its mottled plumage, it is not easily seen.

WHIRLPOOL, *whirl'pool*, a body of turbulent water with a spiral movement due to the shape of its channel, to meeting currents or to the conflict of winds and tides. Small whirlpools occur in rivers and are caused either by the forcing of the current into a circular core in the channel or by an opening in the bank of the stream which draws the water down to a lower level. Sometimes the position of rocks and the di-

rection of currents in the sea cause large and dangerous whirlpools. The most noted of these is the Maelstrom, off the coast of Norway, and the Charybdis, near Sicily. The most celebrated river whirlpool is that of the Niagara River, below the falls.

WHIRLWIND, a sudden and swift spiral movement of the free air of the atmosphere, either the small eddy of the city street which whirls leaves and dust and other light objects about in it, or the more extensive whirls of the deserts and plains. Very powerful whirlwinds are called cyclones or tornadoes. Whirlwinds are caused by the meeting of currents of air, or the collision of currents moving in opposite directions, and except in the case of the small eddies, they all take the same direction—counter clockwise in the northern hemisphere, and clockwise in the southern hemisphere, being governed by the vast planetary movements of the atmosphere. See **CYCLONE**, **TORNADO**.

WHISKY, a spirituous liquor, distilled chiefly from the fermented mash of cereal grains. There are two main varieties of whisky, called malt whisky, in which malt predominates, and grain whisky, in which unmalted grains predominate. The latter was formerly manufactured almost exclusively in the United States, rye and Indian corn being chiefly employed.

In the making of whisky several processes are necessary to convert the starch of the grain into sugar and the sugar into alcohol. The grain is ground, and the starch is cooked in a steamer for several hours to render it soluble. It is then added to the malt, and the mixture is kept at a temperature of 145° F. for about four hours. This saccharine infusion, called *wort*, is then drawn off, yeast is added, and the wort is allowed to stand from three to nine days to ferment. The liquid thus prepared for distillation is technically known as *mash*. It is placed in a metal container called a *still*, subjected to high temperature, and the vapors pass off through a spiral tube known as a *worm* and are condensed. Whiskey requires a period of storage in wooden casks to bring about the changes which develop its aroma and make it palatable.

Related Articles. Consult the following titles for additional information:
Distillation Prohibition
Malt

WHISKY INSURRECTION, the name given to a revolt against the Federal govern-

ment in Western Pennsylvania in 1794. It was the result of the excise law passed by Congress in 1791, imposing a tax on whisky. This tax was a peculiarly heavy burden to the people of Western Pennsylvania, most of whom were dependent for support largely upon the manufacture of whisky. They successfully resisted the attempts of the government to collect the tax and haughtily rejected the offer of amnesty in return for a promise of submission. Finally, in October, 1794, Washington sent 15,000 militia to the scene of the disturbance, and the insurrectionists promptly subsided. Two of the leaders were found guilty of treason, but President Washington pardoned them.

WHISKY RING, a term given in American history to a combination of distillers and Federal revenue collectors, who in Grant's administration conspired to defraud the government of the excise tax on whisky. This "ring" began operations in Saint Louis, where the revenue officers, having knowledge of technical violations of the law, blackmailed the distillers, under threats of prosecution. The decline in the revenue receipts was immediately noticeable, but all efforts at finding the conspirators failed, on account of the presence of their friends in the Treasury Department at Washington. It was only after the most thorough investigation by Benjamin H. Bristow, Secretary of the Treasury, that evidence sufficient to convict was found. The disclosures implicated the chief clerk of the Treasury Department and O. E. Babcock, President Grant's private secretary, but neither was convicted. About two hundred forty distillers and revenue officers pleaded guilty or were convicted in court, but most of the leading ones were pardoned. The total amount of which the government was defrauded was \$1,650,000.

WHIST, a well-known game at cards, first clearly described by Edmond Hoyle, in his *Short Treatise on the Game of Whist* (1743). The game is played with the full pack of fifty-two cards, by four persons, two being partners against the other two, each player receiving thirteen cards, dealt out one by one in rotation. The last card dealt is turned face up and is called the trump card; it gives a special power to the suit to which it belongs. The cards rank ace (highest), king, queen, knave, and the others rank according to their number of spots. Play is commenced by the person on the left hand

of the dealer, who lays down a card face up on the table; the other players follow in succession, with cards of the same suit, if they have them. When all have played, the player who has laid the highest card takes the four cards laid down, which constitute a trick. The winner of the trick then leads, as the first of a new trick, the winner of which becomes the leader, and so on. When a player cannot play a card of the same suit, he may play one of the trump suit and take the trick, or he may lay one of a different suit, which gives him no chance of winning the trick. When the hand is played out, the score is taken as follows: The partners who conjointly gain the majority of tricks score 1 point for every trick taken above six. The ace, king, queen and knave of the trump suit are called honors, in some systems of play, and count 1 each for the side who holds them; if one side hold three honors, they count 2 by honors, as the opposite side can have but one honor; if one side hold all the honors, 4 by honors is counted; should the honors be equally divided, neither side counts. In *long whist*, ten of these points make a game. In *short whist*, the number has been reduced to five, and in this form it is common to count by tricks alone. A rubber consists of a series of three games and is won by the side that secures two of them. In *duplicate whist* the game is played with as many sets of cards as desired. Each hand, as it is played, is laid aside, and at the close of the series of games the hands are exchanged, so that each game is played a second time, partners playing the hands of their opponents. The side that makes the greater number of points in the series wins.

Auction Whist, or **Auction**, as it is now commonly called, is a development of the game of whist, following a process of evolution, the first stage of which was known as Bridge Whist, or Bridge, now practically discarded. The game is played with a full pack of fifty-two cards, as in whist, by four persons, two being partners against the other two, and the cards having the same value as in whist. The trump suit is determined by bidding, the dealer having the first bid. Each player may bid or pass to the player on his left, as the strength of his hand warrants. The value of the suits, both for bidding and for counting in the score, is, Clubs, 6; Diamonds, 7; Hearts, 8; Spades, 9. A player may bid "No Trump," in which case

and if so played, all suits have an equal value, and each trick over six counts 10. For example, if a player bids, "one heart" indicating he is prepared to play the hand with hearts as trumps, and to make seven or more tricks, the next bidder must bid "one spade," "one no trump," these bids indicating a higher value, or "two" or more of same suit, which means a larger prospective gain than "one heart," if successful. The player making the highest bid secures the privilege of playing the hand at his choice of trump, or "no trump." The player at the left of the successful bidder (the "declarer") leads the first card, and the declarer's partner places his hand face up on the table, in view of all the players. The declarer plays the exposed hand as well as his own.

Scoring. Each trick over six (a "book") counts, with clubs, six points, with diamonds, seven points, with hearts, eight points, with spades, nine points, with no trumps, ten points. The side first scoring 30 points wins the game. Two games won out of three constitute a rubber.

Honors	Clubs	Diamonds	Hearts	Spades	No Trumps
Three honors, called "Simple"	30	30	30	30	30
Four honors, in two hands	40	40	40	40	40
Four honors, in one hand	50	50	50	50	100
Four honors, in one hand and fifth in partners	90	90	90	90	
Five honors, in one hand	100	100	100	100	

Beside the point score, which determines games and rubbers, an "honor" score is kept, and is added in when the final score is reckoned up at the end of the rubber to determine the winner. The honor cards are the ace, king, queen, knave (or jack) and ten of the trump suit. If the declaration is "no trumps," the four aces are counted honors.

Contract Bridge, or Contract. This is a development of Auction, differing from the latter in two important respects: (1) in the bidding, the object is to contract, if possible, for game or slam, the successful declarer not being entitled to claim on his point score more than he bids, and suffering a penalty if he fails to make his contract, (2) the scoring is in much larger figures than in Auction, and the penalties for failure to make the bid are much more severe. In bidding, the value of the suits follows the same order as in Auction, but in counting points, clubs and diamonds are known as minor suits,

counting 20 each, hearts and spades as major suits, counting 30 each. 100 points constitute game. The method of play and the rules are set forth in convenient manuals prepared by leading exponents of the game.

WHISTLER, whis'tler, JAMES ABBOTT MCNEILL (1834-1903), an American painter and etcher. He was born at Lowell, Mass., of a prominent family, his father being a distinguished engineer in the United States army. The son was sent to West Point Military Academy, but after three years of uncongenial study he turned to art. He studied in France and England, and in time established a reputation as an etcher, taking rank with the greatest of etchers, Rembrandt. He became famous also for his paintings, pastels and lithograph drawings, which were marked by a unique originality. As a draughtsman Whistler was a consummate master, but in his pictures form was subordinated to color.

Whistler called his paintings nocturnes, symphonies, arrangements. They were executed in one color tone or two related tones, always in a subdued key. His London scenes, under cover of the night or fog, Venetian sketches and studies of the sea, are expressions of poetic moods rather than representations of actual scenes. Whistler's eccentricities brought him into continual conflict with artists and critics, who learned to fear his keen wit and incisive satire.

After 1859 Whistler lived chiefly in London and was for a time president of the Royal Society of British Artists. His best-known painting is a portrait of his mother, in the Luxembourg gallery, Paris. His etchings and paintings form a part of the permanent collections of all the greatest galleries. The best collection of his work is in the National Gallery, Washington, D. C. The artist possessed an unusual gift of literary expression and wrote, among other things, *Ten O'clock*, and *The Gentle Art of Making Enemies*.

WHITE, according to the theory of color, is that color which is a combination of all the colors of the solar spectrum—violet, indigo, blue, green, yellow, orange and red. The observer watching a beam of sunlight passing through a glass prism can see these colors, and they are also beautifully apparent in the rainbow. In practical usage a pure white pigment cannot be obtained by mixing together pigments corresponding to the seven spectrum colors, for pure pigments cannot be secured. Though white is called a color,

in reality it is the presence of all colors. See **COLOR; LIGHT.**

WHITE, ANDREW DICKSON (1832-1918), an American educator, author and diplomat, born at Homer, N. Y. He was educated at Yale, the College of France and the University of Berlin. For a time he was professor of history and literature in the University of Michigan, and when Cornell University was founded he was chosen its first president. He retained the position for eighteen years, and when he resigned he bequeathed to the institution his historical library of 30,000 volumes. In recognition of this and other bequests, the departments of history and economics at Cornell were reorganized as the White School of History and Political Science.

In the course of his college presidency Dr. White rendered important service to the government. He obtained leave of absence and was United States minister to Germany from 1879 to 1881. After he severed his connection with the university, he served the government in several important diplomatic posts, as minister to Russia, as one of the commissioners to investigate the Venezuela boundary, for five years as ambassador to Germany and as president of the United States delegation to the Hague Peace Conference.

He was the author of numerous works on political and diplomatic subjects and of a large number of magazine articles. Among his most important works are *The Warfare of Science against Theology*, *Studies in General History*, *the New Germany*, *the European Schools of History*, *Chapters from My Diplomatic Life* and *Seven Great Statesmen*.

WHITE, EDWARD DOUGLASS (1845-1921), an American jurist, Chief Justice of the United States Supreme Court. He was born at Lafourche, La., educated at Mount Saint Mary's in Maryland, at the Jesuit College in New Orleans and at Georgetown (D. C.) College. He served during the Civil War in the Confederate army, after the war studied law, was admitted to the bar, entered politics and was state senator from 1874 to 1878. From the latter date until 1891 he was an associate justice of the Louisiana Supreme Court. After three years' service as United States Senator he was appointed Associate Justice of the United States Supreme Court, becoming Chief Justice in 1910, by appointment of President Taft.

WHITE, RICHARD GRANT (1821-1885), an American scholar and critic. He was educated for the law, but his literary tendencies drew him from a legal career, and his writings on Shakespeare soon made him recognized as one of the most prominent of Shakespearean scholars. Among his works are *Words and Their Uses*, *Everyday English*, *England Without and Within*, *Studies in Shakespeare*. His *Riverside Edition of Shakespeare* has had wide popularity.

WHITE, STEWART EDWARD (1873-), an American novelist, born in Grand Rapids, Mich., and educated at the University of Michigan. He spent his boyhood among the rivermen of Michigan and early acquired a liking for the forest, which he has so vividly described in *The Forest*. He has written short stories, as well as novels. Among his latest books are *Lions in the Path*, *Back of Beyond*, *Why Be a Mudturtle*, *The Long Rifle*, *Ranchero*, and *Dog Days*. His most famous books were *The Blazed Trail* and *The Leopard Woman*.

WHITE, WILLIAM ALLEN (1868-), an American journalist and writer, born at Emporia, Kans., and educated at Emporia College and the University of Kansas. In 1895 he became owner and editor of the *Emporia Gazette*, which became under his management noted for the excellence of its policies and editorials, one of which, "What's the Matter with Kansas," gained wide publicity. In 1912 White served as chairman of publicity of the Progressive National Committee. He is a member of the National Institute of Arts and Letters. As a penetrating observer and critic of the times White holds a foremost position. His books are not numerous, but are of the very highest quality. Most of them are stories and sketches of life in the Middle West, and include *The Real Issue*, *The Court of Boyville*, *Stratagems and Spoils*, *In Our Town*, *A Certain Rich Man*, *God's Puppets*, *In the Heart of a Fool* and *The Martial Adventures of Henry and Me*, and *The Old Order Changeth*. In 1925, he published a *Life of Woodrow Wilson*, which was well received.

WHITE ANT. See **TERMITES.**

WHITECAPS, in United States history, a name applied, because of the manner of their disguise, to a body of men who assumed the punishment of offenses against a community. In 1880 lawless bands in Southern Indiana undertook to control that section.

At an earlier date a band calling themselves the Knights of the Golden Circle was active in the same district. Whitecaps adopted all methods, from warning and intimidation to actual violence. The Whitecaps were not able long to continue their activities. The chief reason for the rise of such organizations is the slowness with which the law is often administered and the injustice arising therefrom.

WHITEFIELD, *whit'feeld*, GEORGE (1714-1770), an English evangelist, founder of the Calvinistic Methodists, born at Gloucester, England. At the age of eighteen he entered, as servitor, Pembroke College, Oxford. There he met the Wesleys, and became active in their organization, called derisively the "Holy Club." After his ordination as deacon he followed the Wesleys to America, but soon returned to England to raise money for an orphanage in Georgia. Subsequently he made six trips to America, preaching in Georgia, Pennsylvania, and New England. He preached in England, Scotland and Wales, and is said to have delivered 18,000 sermons. His Calvinistic doctrines separated him from the Episcopal Church and ultimately from the Wesleys, and in 1743 he founded the Calvinistic Methodist Society, which, owing to its loose organization, disintegrated after the founder's death, which occurred at Newburyport, Mass. The members joined the followers of Wesley, from which nucleus grew the denomination known as Methodists. See **WESLEY**.

WHITEFISH, a very important freshwater food fish of the salmon family, found in northern waters of both hemispheres. The common whitefish has an elongated body, with a hump back. The head is small and comical and the mouth toothless. Above, the color is bluish or olive, underneath, silvery. These fish live in deep water, feeding on mollusks, insects and larvae, but in the spawning season they migrate to shallow water in shoals. The common whitefish found in the Great Lakes is the most important freshwater fish in America. The yield of this fish for a single year in that country and Canada has been more than 30,000,000 pounds, valued at \$1,500,000. So important is the industry that the United States Fish Commission has taken measures to promote the propagation of these fish.

WHITE HOUSE, called also the **EXECUTIVE MANSION**, the residence of the President

of the United States, at Washington. It is on Pennsylvania Avenue, near several government administration buildings, and it is surrounded by a fine park. The first house on the site was occupied by President Adams in 1800. In 1814 the British army burned it, and the present building was completed in 1829. Extensive interior modifications have been made, and the building has been finished, practically according to the plans of the architect, James Hoban, who designed it in 1792. It faces toward the Potomac, though the entrances on Pennsylvania Avenue is the one in general use. The mansion is of freestone painted white, and is built in the colonial style, with long wings and an Ionic portico. On the second floor are the private apartments of the President and his family. Below are reception rooms, including the large East Room, in which public receptions are held, the Blue Room, in which diplomats making social calls are received, the Red Room, the Green Room, the State dining room and the conservatory. An important and needed addition to the building is a long wing containing the business offices of the President and his secretaries.

WHITE LEAD, a heavy white powder consisting of seventy-five per cent white lead and twenty-five per cent hydrated lead oxide. It is used extensively in the manufacture of white paint, and is prepared by several processes, that most generally employed being what is called the Dutch, or stack, process. Coils of lead are placed in the upper part of an earthen pot containing acetic acid. These pots are stacked, covered with fermenting tan bark or manure, and allowed to remain so for two or three months, in the course of which time the metal is changed to a white powder, known as white lead. In the French process a boracic salt of lead is prepared, and from it boracic carbonate is precipitated by means of carbon dioxide. There are several other processes, some of them electric. White lead is valuable as a pigment, because it has body and purity of color. It dries quickly and does not crack. Its poisonous quality should not be lost sight of.

WHITE MOUNTAINS, a short range of the Appalachian system, situated in the north-central part of New Hampshire, extending approximately northeast and southwest. Because of their lofty summits these mountains are called the "top of New England."

The mountains rest upon a plateau about forty-five miles long, thirty miles wide and 1,600 feet above sea level. Upon this elevation some twenty peaks rise to varying heights. Some of these are separated from one another by narrow valleys, called notches. The mountains are clustered in two groups, of which the eastern is generally known as the White Mountains, and the western, as the Franconia Mountains. These groups are separated by a tableland, varying in width from ten to twenty miles. The principal peaks in the White Mountains are in the Presidential range, so named from the names of the peaks. Of these, Mount Washington, 6,293 feet, is the highest and is also the second highest in the Appalachian system. The other important peaks are Adams, Jefferson, Clay, Monroe, Madison and Boot Spur, all of which exceed 5,000 feet, while Franklin, Pleasant, Clinton and Webster have altitudes of 4,000 feet or more. In the Franconia group the most prominent peaks are Lafayette, 5,269 feet, and Moosilauke, Liberty and Profile, all exceeding 4,000 feet. Intermingled with these prominent peaks in each group are numerous other lower mountains.

The White Mountains are traversed by the famous Crawford Notch, a narrow defile, lined with walls 2,000 feet high, through which the Saco River wends its way toward the sea. The other objects of special interest in this group of mountains are Tuckerman's Ravine, a deep gorge on the south side of Mount Washington, which is always partially filled with snow, and the summit of Mount Washington, which is reached both by carriage road and by railway, the first cog wheel railway in the world. On the summit are a hotel and a station of the United States Weather Bureau.

The principal object of interest in the Franconia Mountains is the Profile, or Old Man of the Mountains. This is a representation of the human face, formed by the projection of three rocks from the face of a nearly perpendicular cliff on the east of Cannon or Profile Mountain. One rock forms the forehead; the second, the nose and mouth, and the third, the chin. The profile is about 1,500 feet above the road from which it is seen, and it is ninety feet in length. It looks down upon a beautiful little lake known as the "Old man's wash bowl." It was an object of worship by the Indians for centuries

before it was known to white men, and it is supposed to have given Hawthorne the inspiration which enabled him to write his beautiful allegory, *The Great Stone Face*. Near by is Echo Lake, a beautiful sheet of water, so enclosed by hills that an ordinary tone of the voice is repeated five times.

The summits of the White Mountains are bare and are composed of a variety of rock known as mica schist. The reflection of the sunlight upon this rock, when seen at a distance, gives the mountains the appearance of being covered with snow; hence the name, White Mountains or White Hills. For a century these mountains have been the great playground of New England. Their bases and sides are clothed with forests, among which are many winding roads and enticing walks. Clear, rushing streams and sparkling cascades surprise the traveler at many a turn in the path, and summits easily reached afford enchanting views.

WHITE PLAINS, BATTLE OF. When Washington evacuated Long Island he moved his main force to White Plains, N. Y., on October 23, 1776. An outpost of 1,400 men was stationed on Chatterton Hill. On this outpost a British force of 4,000 made attack on October 28, routing the Americans, who withdrew to the main camp. This engagement is known as the Battle of White Plains.

WHITE RIVER, the principal tributary of the Wabash in Indiana. It is formed by the union of the East and West branches, which rise near the eastern boundary of the state and flow in a general westerly direction. The two streams unite near Petersburg, and the main stream then flows southwest for fifty miles and joins the Wabash just above Mount Carmel, Ill. On the West Fork are situated Indianapolis, the state capital, Noblesville, Anderson and Martinsville, the latter at the head of navigation. The East Fork is navigable to Rockford.

WHITE RIVER, a river of Arkansas, which rises in the northwestern part of the state, in the Ozark Mountains, where it is formed by several small streams, and flows northeastward into Missouri, returns into Arkansas and, after a general southeasterly and southerly course, enters the Mississippi fourteen miles above the mouth of the Arkansas. Its length is about 800 miles. Locks and dams make it navigable for river steamers about 480 miles. The large towns on its banks are Clarendon, Batesville and Newport.

WHITE SEA, a large arm of the Arctic Ocean, which penetrates Northern Russia to a distance of about 500 miles. The width ranges from thirty-five to 150 miles. It is broad at the northern entrance, but near its middle it narrows to a strait. Below this it spreads out in three large branches—Kandalak Bay, in the northwest, and Onega and Dwina bays, in the southeast. The chief rivers flowing into it are the Onega, the Dwina and the Mezen. Onega and Archangel are the principal ports. This sea is ice-bound from September to June, but it has a brisk summer trade, being connected by canals with the Baltic and with the Black and Caspian seas.

WHITLOCK, BRAND (1869-1934), an American diplomat, municipal reformer and writer. He was born at Urbana, Ohio, and was privately educated there. In his early years he had much experience as a newspaper reporter in Toledo, Ohio, and Chicago, Ill. He studied law, and in 1897 established a successful practice in Toledo. His books describing corruption in politics and injustice in business attracted much attention. In 1905 he was elected mayor of Toledo and three times thereafter, but declined a fifth nomination. In 1913 he was appointed by President Wilson United States minister to Belgium, and in that position gained the admiration of the world at the beginning of the World War through the tact, energy and efficiency shown in handling the difficult situation. In 1919 his post was raised to the rank of ambassador. His writings include *The Happy Average*, *Her Infinite Variety*, *The Fall Guy*, a volume of short stories, *On the Enforcement of Law in Cities*, *The Turn of the Balance*, *The Gold Brick*, *Abraham Lincoln*, a biography, *Forty Years of It*, an autobiography. In 1919 he published *Memoirs of Belgium, a Personal Narrative*, later issued in America under the title *Belgium*. His novels *Transplanted* and *Uprooted* are based on his observations in Europe. *La Fayette*, a biography, appeared in 1929.

WHITMAN, MARCUS (1802-1847), an American physician and missionary, born at Rushville, N. Y. He studied medicine at the Berkshire Medical Institution at Pittsfield, Mass., practiced four years in Canada, and in 1836 was sent by the American Board of Commissioners for Foreign Missions to explore the Oregon country and preach to the Indians. With his wife and two other

missionaries he crossed the Rocky Mountains in 1836, taking the first wagon over the mountains. Other missionaries followed. Dissensions among them led the Board to withdraw its support. Whitman journeyed from the settlement, near the site of Walla Walla, to Boston, traveling much of the way on foot, and prevailed upon the Board to alter its decision. Whitman, his wife and twelve companions were murdered by Indians in 1847.

WHITMAN, WALT (1819-1892), an American poet, born at West Hills, Long Island, N. Y. He left the public schools of Brooklyn at the age of thirteen and applied himself to his father's trade, that of carpenter. Later he worked as a printer, school teacher and as general writer for the press. In these early years, as later, he sought with characteristic democracy the society of working men, and had many friends among them. During the Civil War he gave splendid service in the hospitals of Virginia and Washington, and permanently injured his health. At the close of the war he became a clerk in the Interior and Treasury departments at Washington, remaining until 1874, when a stroke of paralysis compelled him to resign.

In 1855 the first edition of his *Leaves of Grass* had been issued, and much of his later life was given up to the enlargement of this originally small volume. Whitman's avowed purpose was to be the prophet of democracy and of the common brotherhood of man. In his desire to free himself from all traditional trammels and to achieve naturalism, he often becomes tiresome. Though his work shocks many lovers of poetry by its lack of rhyme and rhythm, among discriminating critics it takes high rank, and it is becoming increasingly popular, not only among American readers, but also in Europe.

WHITNEY, ELLI (1765-1825), an American inventor, famous as the originator of the cotton gin. He was born at Westborough, Mass., and was educated at Yale College. After graduation he went to Georgia as a teacher, later he took up the study of law. His leisure moments he often employed inventing useful devices, and, learning that the cotton industry was hampered by the difficult work of separating the cotton fiber from the seeds by hand, he set to work to invent a remedy. He labored under great disadvantage, for he had to make his own tools, but in time he produced a machine which would seed a thousand pounds in

the same time that five could be seeded by hand.

At this juncture his workshop was broken into, and his apparatus was stolen before he could secure a patent. However, he and a man named Miller formed a partnership, and in 1793 they went to Connecticut to manufacture cotton gins; but the lawsuits in defense of Whitney's rights took all his profits, besides \$50,000 voted him by the state of South Carolina. Finally, in 1798, Whitney turned his attention to the



ELI WHITNEY

manufacture of firearms; he established a factory at Whitneyville, Conn., received large orders from the government and amassed a fortune. From his invention of the cotton gin, one of the most important of the whole series of inventions connected with the cotton industry, he reaped only belated fame. See COTTON GIN.

WHITNEY, JAMES PLINY, Sir (1843-1914), a Canadian statesman, born at Williamsburg, Ont., and educated at the Cornwall grammar school. He began the practice of law in 1876, and in 1890 was appointed queen's counsel. He was first elected to the legislature of Ontario in 1888, and was returned at each election up to and including that of 1908. In 1896 he was chosen leader of the opposition, and in 1905 was called upon to form a new government. In this he became the Prime Minister and assumed the office of Attorney-General. Later he relinquished the latter portfolio and became President of the Council. The honor of knighthood was conferred upon him by H. R. H. the Prince of Wales, in 1908, on the occasion of the celebration of the Quebec Tercentenary. He continued as Premier until his death.

WHITNEY, MOUNT, the highest peak in the United States proper, situated in the southern part of the California Sierra Nevada. Its altitude is 14,502 feet, and its eastern slope rises steeply to a height of nearly 11,000 feet. Mount Whitney was named in honor of the noted geologist, Josiah Dwight Whitney.

WHITTIER, JOHN GREENLEAF (1807-1892), one of the foremost American poets. He was born near the town of Haverhill, Mass., Dec. 17, 1807. His parents were Quakers, who were always anxious to advance the interests of their children. The farm house was not far from the Merrimac River and near it was the brook whose "liquid lip" was companionship to them.

The young Whittier worked on his father's farm and learned the shoemaker's trade. He had little early education, except a few terms in the district school, and the wider training he received from his father and mother. Of books he had few and those not the best adapted to a child. The Bible, however, was thoroughly studied and its literary treasures fully appreciated. A volume of Burns fell into his hand and gave him the poetic inspiration. At the age of



JOHN GREENLEAF WHITTIER

eighteen Whittier began writing for the press. One of his poems which appeared in the Newburyport *Free Press* attracted the attention of William Lloyd Garrison, its editor. Garrison visited the young poet at his home and induced him to give his pen and his life to the cause of freedom. This was the beginning of a life-long friendship. Garrison urged Whittier to obtain a better education, and assisted him in securing it.

Although Whittier had had comparatively little schooling, he had read widely and was well fitted to become, as he did, the chief poet of the abolition movement. In 1835 and 1836 he was a member of the legislature of Massachusetts, but ill health compelled him to resign and give up also the editorship of a paper which he was managing. In 1836 he moved to Amesbury, and some years later he went to Philadelphia, where he edited the *Pennsylvania Freeman*, an anti-slavery paper, the office of which was burned by a mob after he had been at work on it but four days. This did not compel Whittier, however, to give up the work, which he continued for two years. After his return to Amesbury, his poems on freedom continued to appear, and in 1843 a volume of ballads was published. Among his notable poems of these

years, which appeared in *The National Era*, the *New England Magazine* and the *Atlantic Monthly*, were *Songs of Labor*, *Maud Muller* and *Barbara Frietoch*. *Snowbound*, published in 1865, brought great increase to Whittier's popularity and also an improvement in his worldly circumstances. He had no family, however, and most of his money was spent in charity. He died while on a visit to Hampton Falls, N. H.

Whittier's poems on slavery were too thoroughly inspired by the occasion for which they were written, too much given over to argument on this subject, to be permanently great poetry, but their energy and sincerity made them most effective aids toward the ends to which they were directed. Among his other poems, *The Barefoot Boy*, *Telling the Bees*, *Snowbound* and *Among the Hills* are most notable. They have a homely truth to life, a fineness of sentiment, a freshness and a quiet power which will make them live.

WHOOPIING-COUGH, *whoop'ing kof*, or pertussis, a contagious disease that frequently becomes epidemic. Half of those affected are less than 2 years old, adults rarely have it. It begins with the symptoms of a mild bronchitis. After a week or ten days the coughing is in paroxysms that end with a whoop, caused by a forcible undrawing of the breath. These paroxysms occur at rather short intervals, but between them the person feels reasonably well. After three to six weeks the attacks occur less frequently. Within two months they usually disappear entirely, although an ordinary cough persists for a few weeks longer. The disease is probably caused by a bacterium, the *Bacillus Pertussis*. It is sometimes fatal in infants because of complications, especially pneumonia. A child suspected of having whooping-cough should be kept from other children, for the disease is highly contagious. The patient should have nourishing food and live in the open air as much as possible. The sleeping room should be well ventilated, and whenever possible it is wise to sleep on a porch or in a tent.

WICHITA, *wich'itaw*, KANS., the county seat of Sedgwick County, 157 miles southwest of Topeka, on the Arkansas River and on the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, the Saint Louis-San Francisco, the Missouri Pacific and the Midland Valley railroads. There are five airports and landing fields. Wichita is

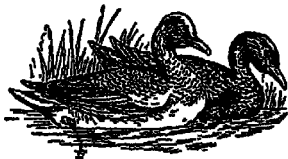
surrounded by a rich agricultural region with extensive trade in farm products.

It is the largest broom corn market in the world. Dry storage space amounts to 367,000 square feet, and cold storage space to 1,300,000 cubic feet. The wholesale business of the city amounts normally to about \$175,000,000 annually. It includes automotive products, drugs and chemicals, dry goods and clothing, farm products, food and tobacco, furniture and house furnishings, electrical and radio equipment and farm machinery. Wichita is the oil headquarters of Kansas. The several local airplane factories are widely-known pioneers in aviation engineering.

Notable institutions and buildings are Friends University, the Municipal University of Wichita, the Exposition and Forum with a seating capacity of 8,000, the Masonic Home and the Carnegie Library. Wichita was settled by Indian traders in 1869 and named from the Wichita tribe. It was chartered as a city in 1872. The city manager form of government was adopted in 1917. Population in 1930, 111,110, a gain of 54 per cent in 10 years.

WICHITA FALLS, Tex., the county seat of Wichita County, 114 miles northwest of Fort Worth on the Wichita River and on the Fort Worth & Denver City, the Missouri-Kansas-Texas, the Wichita Falls & Southern and the Wichita Valley railroads. It has a municipal airport. The principal industries are oil refining, oil machinery, glass products, clothing and flour. There is a junior college. The city was settled in 1862. The population in 1930 was 43,690.

WIDGEON, *wid'jun*, a wild duck found in both Europe and America. The American widgeon, which is most abundant in the



WIDGEONS

South, is often called the *bald pate*, from the white on the top of its head. It spends the winters in Central and South America and nests in Canada. The eggs, from seven to

twelve in number, are buff-white. Widgeons are notorious for their trick of robbing canvasbacks and other diving ducks of the plant food picked from the beds of streams, by snatching it from their bills as they come out of the water.

WIESBADEN, *vees'bah den*, GERMANY, a celebrated watering place situated in the valley of the Salzbach, about two miles from the Rhine and six miles northwest of Mainz. The town has a beautiful location among densely-wooded hills, that protect it from cold winds. Mineral springs abound. It is purely a residence town, with no industries of importance. There are a number of churches of historic interest, a museum, a picture gallery, a public library, agricultural and industrial schools and an institution for the blind. Population, 1933, 159,755.

WIG'GIN, KATE DOUGLAS. See RIGGS, KATE DOUGLAS WIGGIN.

WIGHT, *wite*, ISLE OF. See ISLE OF WIGHT.

WIG'WAM, the conical tent of the American Indian. To make it he drives several saplings into the ground in a circle and fastens them together at the top. This framework he covers with grass matting or birch bark, leaving an opening at the top for the escape of smoke. A small opening in the side—always the side of the rising sun—serves as a door. This is ordinarily covered with a flapping deer-skin curtain.

WILBERFORCE, *wil'bur fohrs*, SAMUEL (1805-1873), an English clergyman, third son of William Wilberforce (see below), was born at Clapham. He was graduated from Oriel College in 1826 and two years later was ordained. He was successively curate of Cheekendon church; rector of Brightstone, Isle of Wight; archdeacon of Surrey; rector of Alverstoke and canon of Winchester; chaplain to the prince, a position gained through an anti-slavery speech; dean of Westminster and bishop of Oxford, where he remained twenty-four years. Wilberforce, by his cleverness and persuasive power, was able to cope with the difficult situation in the Church at the culmination of the Oxford Movement, when many of the High Church party went over to the Roman Catholic Church. Among his writings are *Letters and Journals of Henry Martyn*, *Agathos*, *Rocky Island* and *History of the American Church*.

WILBERFORCE, WILLIAM (1759-1833), an English statesman and philanthropist, born at Hull, in Yorkshire. After completing his education at Saint John's College, Cambridge, in 1780 he was elected member of Parliament. In 1792 he succeeded in getting a bill for the gradual abolition of slavery through the House of Commons; but it was rejected by the House of Lords. Year after year he pressed this measure, and in 1807 it was passed, during the administration of Fox. His efforts finally resulted (1833) in a bill which abolished slavery in the British colonies. He was a man of remarkable versatility and personal attractiveness.

WIL'BUR, CURTIS DWIGHT (1867-), an American lawyer and jurist. He was born in Iowa, and graduated from the Naval Academy at Annapolis in 1888. He resigned from the navy soon afterwards and began the practice of law in Los Angeles, where he served the city and county as attorney and county judge for many years. In 1918 he was elected to the Bench of the Supreme Court of California, in time becoming Chief Justice, a position which he relinquished early in 1924 to accept the post of Secretary of Navy, tendered him by President Coolidge.

WIL'COX, ELLA WHEELER (1855-1919), an American poet and essayist. She was born in Wisconsin, was educated at the University of Wisconsin and was married in 1884 to Robert M. Wilcox. From her girlhood she contributed freely to newspapers and magazines, and some of her writings have acquired considerable popularity. Her volumes of verse include *Poems of Pleasure*, *Poems of Passion*, *Poems of Power and Maurine*.

WILD CAT, or CAT'AMOUNT, a wild animal belonging to the same family as the domestic cat, but of larger size than the latter.



WILD CAT

The European wild cat once common, but now seen only in the most isolated regions, has a very long body and legs and a short, thick tail. Its fur is yellowish-gray, with

a dark marking down the back and other dark stripes on the sides and rings on the tail. In the United States the name is often applied to the lynx (which see)

WILDOAT BANKS, unstable banking institutions under loose state control, whose reckless issue of notes, followed by inability to redeem the same, were responsible for a series of financial panics in the United States in the generation preceding the Civil War. The most disastrous of these panics was that of 1837. President Jackson having removed the government deposits from the United States Bank and placed them in state banks, wildcat banks sprang up like mushrooms. Alarmed by the subsequent wild speculation, the President sought to correct the evil by ordering, through his famous "Specie Circular," that only gold and silver be received in payment for public lands. This precipitated a crash, and large numbers of wildcat banks failed. See JACKSON, ANDREW

WILDE, OSCAR FINGAL O'FLAHERTY WILKS (1856-1900), dramatist, essayist and novelist, was born at Dublin, Ireland, the son of a noted surgeon. After graduation from Oxford, where he won honors in literature, he went to live in London and became leader of a so-called aesthetic movement. His affectation of long hair, velvet knee breeches and a languishing air furnished a theme for much witty satire. He was lampooned by Du Maurier in *Punch* and by Gilbert in his opera *Patience*.

In 1881 Wilde published a volume of poems, and in 1888 a collection of fairy stories called *The Happy Prince and Other Tales*. These won high praise. Then appeared *The Picture of Dorian Gray*, a novel; *Intentions*, a volume of essays, and the plays *Lady Windermere's Fan*, *A Woman of No Importance*, *The Ideal Husband* and *The Importance of Being in Earnest*. His drama *Salome* has been set to music by Richard Strauss. In 1895 Wilde was convicted of a serious offense against morality, and was condemned to two years' penal servitude. In prison he wrote *A Ballad of Reading Gaol*, a poem of much force, and *De Profundis*. His last years were spent in seclusion on the Continent.

WILDERNESS, BATTLE OF THE, the first important battle of Grant's famous Virginia campaign in 1864, between a force of 120,000 men under General Meade, supported by Warren, Sedgwick and Hancock, and with

General Grant in supreme command, and the Army of Northern Virginia, under Lee, comprising about 62,000 men under Ewell, Hill and Longstreet. The Federals were encamped on the northern bank of the Rapidan River, near Culpepper Court House, while the Confederates were south of the river, on the edge of the Wilderness, where Lee had completely baffled Hooker's army after the Battle of Chancellorsville. Grant began crossing the river on May 3, without a contest, Lee being confident that he could defeat the Federals when they had once become entangled in the Wilderness, a dense forest with thick underbrush. In the morning of May 5, General Warren, who was in the van of the Federal force, was met by General Ewell, and an all-day battle resulted, with little advantage to either contestant. Grant at first believed that he was confronting only a part of Lee's army, but soon ordered Hancock to come up from Chancellorsville. Upon his arrival, he confronted General Hill, and another severe battle ensued, which paused at nightfall, only to recommence at dawn. It ended in a drawn battle, Grant had failed to make progress toward Richmond, Lee had failed to crush the opposing army. The losses of the Union forces were about 18,000, of the Confederates, from 10,000 to 12,000. See CIVIL WAR IN AMERICA

WILHELMINA, *vil hel me' nah*, (1880-), queen of the Netherlands, born at The Hague. In 1890, on the death of her father, Wilham III, she succeeded to the throne, her mother, who was the daughter of Prince George Victor of Waldeck, serving as regent until 1898. Wilhelmina was married in 1901 to Henry Frederik, Duke of Mecklenburg-Schwerin. Her daughter, Juliana, heiress to the throne, was born in 1909.

The general unrest in Europe which followed the World War threatened the stability of her throne for a time in 1919, but she had always held the deep love of her subjects and was able to overcome the socialist tendency of the minority.



QUEEN
WILHELMINA

WILKES, *wilks*, CHARLES (1798-1877), an American naval officer and explorer, born in New York City. He was educated in the common schools, entered the United States navy in 1818 and became a lieutenant in 1826. In 1838, in charge of an expedition authorized by Congress to explore the Southern Ocean, he visited many important places in the southern hemisphere, including the Philippine Islands, Hawaiian Islands, New Zealand, the Samoan and Fiji groups and many parts of South America. The mass of valuable scientific information collected on his voyages was published in several volumes. Wilkes was made a commander in 1843 and became a captain in 1855. Upon the outbreak of the Civil War he was given command of the frigate *San Jacinto*. On November 8, 1861, he overtook the English mail steamer *Trent* and arrested Mason and Sidel, the Confederate commissioners (see TRENT AFFAIR.) He was retired in 1864, and became rear-admiral in 1866.

WILKES-BARRE, *wilks' bair re*, PA., the county seat of Luzerne County, 145 miles northwest of Philadelphia, on the north branch of the Susquehanna River, and on the Pennsylvania, the Lehigh Valley, the Central of New Jersey, and the Delaware & Hudson railroads. There is an airport. The city is unique in that it is surrounded by thirty-three municipalities.

The city is in the heart of the anthracite region of the Wyoming Valley, the coal output of Luzerne County being greater in annual value than the entire gold production of the United States, exclusive of Alaska. Mining is the principal industry, but the abundance of fuel has made the city an important manufacturing center. The silk and lace mills are the oldest and among the largest in the United States, and there are besides manufactories of metal products, axles and springs, wire rope, adding machines, cutlery, flour and clothing.

The educational institutions include the Harry Hillman Academy for boys, the Wilkes-Barre Institute for girls and several Catholic schools. The Osterhout Free Library has more than 40,000 volumes, and the Wyoming Historical and Geological Society has a reference library and a notable collection of Indian relics and geological specimens and fossils. There are homes for children and aged women and several well-equipped hospitals.

The city was first settled in 1769 by families from Connecticut. It was named in honor of John Wilkes and Isaac Barré, members of the British Parliament who advocated the cause of the colonists before and during the Revolution. In 1784, during the controversy between Pennsylvania and Connecticut over the sovereignty of the Wyoming Valley, the settlement was burned. The Wyoming Monument marks the site of the conflict of the Americans with the loyalists and Indians, July 3, 1778. Wilkes-Barre was made the county seat in 1786 and was incorporated as a borough in 1806. After the Civil War it grew rapidly and was chartered as a city in 1871. Population, 1930, 86,626.

WILKIE, DAVID, Sir (1785-1841), a celebrated Scottish painter. He received his early art training at the Trustee's Academy, Edinburgh, and entered the schools of the Royal Academy, London, in 1805. His first works were scenes from every-day life, in which he showed the influence of the Dutch masters. In his later work, after his visits to Italy and Spain, he showed the influence of Titian and Velasquez and changed his theme to historical and portrait subjects. In 1811 he was made a member of the Royal Academy. Among his pictures are the *Blind Fiddler*, *Rent Day*, *The Village Festival*, *Penny Wedding*, *Cotter's Saturday Night*, *Duncan Gray*, *Blind Man's Buff*, *John Knox preaching before the Lords of the Congregation* and *Wellington Writing a Dispatch*.

WILKINS, SIR GEORGE HUBERT (1888-), an English aeronaut, explorer, and scientist, born in South Australia and a member of the Australian Flying Corps in the World War. Before the war (1913), he was photographer for the Stefansson Arctic expedition, and became interested in the cold regions of the world. In 1919 he was navigator on an airplane flight from England to Australia; in 1921 he joined the Shackleton Arctic expedition; in 1928 he flew from Alaska to Spitsbergen, and in the next year headed an expedition into Antarctica, where he explored hitherto unknown lands. Wilkins attempted a hazardous submarine trip under Arctic seas in 1931, but it failed when he was 400 miles from the North Pole, because of mishaps to the unseaworthy vessel. It was his most dangerous exploit. In 1928 he was knighted by King George V.

WILKINS, MARY ELEANOR. See FREEMAN, MARY E. WILKINS.

WILL, that mental activity which gives a human being power of choice and action. Desire or feeling lies at the foundation of will, and the two are so interwoven that they cannot be separated.

J B Watson, the founder of behaviorism, once ventured the claim, "Give me a baby for three years and I will make any kind of a man of him you say." But so few babies receive perfect treatment that the psychologist finds many problems to solve. His professional counsel is often asked in guiding the growth of a young child's emotions and will, or in helping a painfully shy youth, or a law breaker, or a man who suffers a nervous breakdown, or a worker who cannot find the right job or perform his work safely, or a man and woman who will not live together happily as husband and wife. This wide field of service has attracted the psychologist, not because he is a jack of all trades but because most of the heartaches and failures in the world are due to the same cause: wrong mental and emotional adjustment—leading to a lack of will or to a will to do the wrong things.

This adjustment should properly take place in the first few years of life. Once this formative period has been past, it is hard to change a person's reactions to the world he lives in. It is, therefore, most important to know what the normal development of a baby is. During the first few years of life, the rate of growth of the brain and the amount of learning is much greater than it will ever be again. Even before birth, the nervous system controls the whole organism. A baby makes enormous advances both in controlling and in guiding his movements and in seeing the relationships in things and people around him. Recall that a new born baby has three instinctive emotions, love, fear, and anger, and that there are but a few certain causes which will produce any one of these emotions. A loud noise will make a baby shrink in fear. If every time he hears a loud noise, a rabbit is brought close to him, he will soon shrink from the rabbit even when there is no loud noise. His fear of rabbits was not inborn, as is his fear of noises. It has been acquired by association, or by what is called conditioning. This simple demonstration shows the way in which numerous fears, outbursts of temper and violent preferences that we find in older children and adults are built

up. It shows also that many of the actions of a person are not deliberately willed, but are reactions to circumstances.

The baby begins early to respond to the behavior of those around him. If the people who care for him are kind and intelligent in their care, he in his turn will smile and love. If they are cross and awkward, he soon learns to cry and kick and to be wilful.

Graded scales of tests have been standardized so that the behavior and abilities of a child can be compared with those of other children of the same age. For instance, a four months baby will push his hand against a block and perhaps be able to pick it up, but a typical twelve months old child will nicely grasp the block between his thumb and first finger. Since each individual develops at his own rate, a slight difference from the typical performance means little. A child should not be forced ahead faster than his natural rate. But when a child is found to be backward, far behind other children of his age, he should receive special help. This training is important not only so that he can take care of himself in the future, but also to protect him from unfortunate situations in which he is made to feel inferior, or perhaps is punished for being lazy. It should be carefully done, however, so that the child does not develop into a dependent person without a will of his own.

Soon, when the child can get about for himself in his small world, he finds innumerable fascinating objects to explore and to learn about. But with this wonderful new world before him, he also finds himself chained down by don'ts. At this point he must be taught to respect the property and rights of others. But if he is merely restricted, he will become rebellious and resentful. He may not always show this outwardly. In fact he sometimes becomes the most docile and obedient of children only later to flare out in ungovernable temper or really malicious revolt. On the other hand, he may begin to feel very inferior, and this is almost as bad. It is said that 75 per cent of lying is traceable to this feeling of inferiority. Irritability is frequent among adults who have been brought up in an atmosphere of repression and parental tyranny. The will of the child should be respected and developed—not thwarted.

At the other extreme is the child who is

always allowed to have his own way, never restrained, never punished. Although his parents may tolerate him, he soon finds that the outside world is a very different place where he cannot have his own way. The temper tantrums and crying which he found so convenient at home only react on himself. Some children brought up in such surroundings are never able to change, but grow up into men and women who are always getting into trouble. Such a person has never been taught that the wills of other people must be respected.

A child then should be brought up in surroundings as much as possible like those he will meet outside of his home. He should not be told arbitrarily not to do this or that, but be taught that other people have rights and that he cannot always do just as he pleases. When he comes to understand that his will is not supreme, he learns to fit very well into society.

When a child leaves home and starts to school he does not at once begin playing organized games. At about ten years he begins playing group games often competitive, and enters upon the "gang" age. He sometimes is the leader, sometimes follows. Although bad companions sometimes make this stage of development a dangerous one, the gang spirit when properly guided can be used to develop fair play and cooperation. This is really the best training ground for the will. The child meets his equals, and learns by trying to impose his will on others and by reacting against the imposition of their wills on him to develop a balanced character. In such situations the difficulties of superiority and inferiority are avoided. All these stages in a child's growth develop naturally at the proper time. They may be regarded as perfectly normal, not to be interfered with. Indeed, many times a child must be left alone—a lesson difficult for most parents and teachers.

If the child so far has been brought up sensibly and normally, he will find adolescence a happy and exciting experience.

Although the parent naturally wants his child to do as well as possible when he starts out to earn his own living, the parent should set tasks and goals which are within his capacity. In this way he becomes successful and happy, he gains confidence and poise, and retains the balance between dependence and independence which is typical of a

properly developed will. Some of the most authoritative psychologists today say a nervous breakdown or social maladjustment is just prolonged childishness, the result of thwarted and under-developed will power.

W V B

Related Articles Consult the following titles for additional information

Attention	Instinct
Feeling	Memory
Habit	Psychology

WILL, in law, the legal declaration of a person's wishes as to the distribution of property after his death. It is an individually-made law, which, if its intent is clear beyond doubt and it does not conflict with public policy, no court can set aside. Technically, a will can dispose only of real property, the document relating to the disposal of personal property being called a *testament*.

In most states no will or testament is valid unless it is in writing and signed at the end by the maker, or *testator*, or by some person in his presence and by his direction. This signature must be made and the document acknowledged by the testator, in the presence of two or more witnesses, not beneficiaries by the will, present at the same time, and such witnesses must attest and sign the will in the presence of the testator. The will usually names one or more persons, known as executors, to direct the execution of its provisions. If none such is named, or if no will is made, the court appoints an administrator to the estate. In the latter case the property goes to lineal descendants (For the rules for the disposal of the estate in the latter case, see *DESCENT*). Any alteration in the will must be duly signed by the testator and the witnesses. An addition to the will is known as a *codicil*. A will may be revoked by canceling, obliteration, tearing or burning, by a new will expressly revoking the former, or by one containing provisions inconsistent with it. The destruction of a later will revives a former will. At the death of the testator the will is recorded in the probate court, and that court directs settlements. See *PROBATE*.

WILLAMETTE, *wil lah'met*, a river of Oregon, 250 miles in length, formed by the junction of the McKenzie and the Middle Fork. It rises in the Cascade Mountains, flows northward through a fertile valley and into the Columbia River. It is navigable to

Portland, fifteen miles from its mouth. A lock canal enables small craft to go around Willamette Falls and ascend 150 miles to Eugene.

WILLARD, EMMA HART (1787-1870), one of the pioneers in the cause of women's higher education in America, and founder of the Emma Willard School. She was born at Berlin, Conn. She taught a number of years, became principal of a girls' academy at Middlebury, Vt., and in 1809 married Dr. John Willard. In 1814 she wrote and submitted to New York state officials *A Plan for Improving Female Education*, with the result that she was able to establish at Waterford, N. Y. a girls' seminary partly supported by the state. This institution was removed to Troy and the name afterward changed to Emma Willard School. Under Mrs. Willard's management, it gained a wide reputation and is still one of the leading schools for the higher education of women. Mrs. Willard wrote a number of text-books, and was also the author of the famous poem *Rocked in the Cradle of the Deep*.

WILLARD, FRANCES ELIZABETH (1839-1898), an American educator and reformer, born at Churchville, N. Y., and educated at Northwestern Female College, Evanston, Ill. She taught school for several years, traveled in Europe and the East and on her return became professor of aesthetics in Northwestern University and later its dean of women. She resigned in 1874, became secretary of the Woman's Christian Temperance Union and later its president, holding the latter office until her death.



FRANCES E.
WILLARD

Miss Willard gave her entire time thereafter to the organization, traveling throughout the country from year to year, lecturing in prominent cities and writing extensively for the *Union Signal*, the organization's periodical, which she edited for six years. In 1883 she visited England and helped to form the World's Christian Temperance Union. Her former home, "Rest Cottage," in Evanston, is yet the headquarters of the national organization. In addition to articles in papers and periodicals, she was the author of *Nineteen Beautiful Years*, *Woman and Tem-*

perance, *Glimpses of Fifty Years* and other books. See *WOMAN'S CHRISTIAN TEMPERANCE UNION*.

WILLIAM I, surnamed **THE CONQUEROR** (1027-1087), the first Norman king of England. He was the natural son of Robert II, Duke of Normandy, and as his father died without a legitimate heir, William became ruler and governed Normandy with vigor and ability.

On the death of Edward the Confessor he claimed the crown of England as the nearest in line of succession. In 1066 he invaded England, overthrew Harold, the rival claimant, and then set about to subdue the people. The resistance of two powerful English nobles, Edwin and Morecar, who had formed an alliance with the kings of Scotland and Denmark and with the prince of North Wales, soon after drew William to the north, where he obliged Malcolm, king of Scotland, to swear allegiance. In 1069 an insurrection broke out in the north, and at the same time the English resumed arms in the eastern and southern counties, only, however, to be put down mercilessly.

William then established the administration of law and justice on a firm basis throughout England, conferred numerous grants of land on his own followers and introduced the feudal system of Normandy, in regard to land tenure and services. Toward the end of his reign he instituted that general survey of the landed property of the kingdom, the record of which still exists, under the title *Domesday Book*. Although the English had been completely subdued, William had to suppress several formidable revolts of his own vassals, and these he put down with an iron hand. Some of his measures were extremely severe, but they were in keeping with an age of brutality.

As a man William was not without a certain sense of equity and fair dealing, but was willing to sacrifice everything to make his kingdom stable. Viewed in the perspective of history, he is seen as one of the makers of modern England. See **HASTINGS, BATTLE OF**, **DOMESDAY BOOK**.

WILLIAM II (about 1056-1100), called **RUFUS** ("the Red"), son of William the Conqueror, was crowned king at his father's death. The Norman barons were discontented with this arrangement and sought to make his elder brother, Robert, who had received Normandy, king of England, but this

project was defeated by William, with the aid of the English nobles. Having repressed the conspiracy, he forced the Norman barons to withdraw to Normandy and confiscated their English estates. On the death of Lanfranc, he also seized the estates connected with the vacant bishoprics and abbeys. In 1090 he sent an army into Normandy, to punish his brother Robert, while he himself crossed the Channel the following year. A reconciliation was effected between the two brothers, and in 1096 Robert mortgaged Normandy to his brother, for a sum sufficient to enable him to join a crusade to the Holy Land. William was shot while hunting in the New Forest, whether accidentally or otherwise is not known.

WILLIAM III (1650-1702), king of England, Scotland and Ireland. He was born at The Hague, the posthumous son of William II of Orange and Mary, daughter of Charles I of England. During his early life, all power in the Netherlands was in the hands of the grand pensionary DeWitt, but when France and England in 1672 declared war against the Netherlands, there was a popular revolt, in which DeWitt and his brother were murdered and William was declared captain-general, grand admiral and stadtholder of the United Provinces. In 1678 William concluded with France an honorable treaty at Nimeguen.

Meanwhile, William had married Mary, the daughter of James II of England. As she was heir presumptive to the English throne he kept close watch upon the policy of James II, and in 1688 issued a declaration recapitulating the unconstitutional acts of the English king and promising to secure a free Parliament to the people. Being invited over to England by the leaders of the English parties, he arrived suddenly at Torbay in November, 1688, with an army. A great part of the nobility declared themselves in his favor. In December James fled with his family to France.

The throne was then declared vacant, the Declaration of Rights was passed, and early in 1689 William and Mary were crowned. Scotland soon afterwards accepted the new sovereigns, but in Ireland, whither Louis XIV sent James with an army, the majority of the Catholics maintained the cause of the deposed king, until they were defeated at the Boyne (1690). In the war with France William was less successful; but in spite of

several defeats, he finally compelled Louis to acknowledge him king of England. In 1701 James II died and Louis XIV acknowledged his son as king of England. England, Holland and the Empire had already combined against Louis, and the War of the Spanish Succession was just on the point of beginning, when William died from the effects of a fall from his horse.

WILLIAM IV (1765-1837), king of Great Britain and Ireland, the third son of George III. He was educated for the navy, and although he had no real ability, he was promoted through successive ranks, until he became lord high admiral. In 1830 he succeeded his brother George IV on the throne. The great events which render his reign memorable are the passage of the Reform Act, the abolition of slavery in the colonies and the reform of the poor laws. William himself was mentally most unfit for ruling, but his ministers had matters almost entirely in their own control. He was succeeded by his niece, Victoria, whose reign was destined to be the longest and one of the most notable in English history.

WILLIAM I (1797-1888), king of Prussia and first emperor of Germany, crowned as such at Versailles in 1871. He was the son of Frederick William III of Prussia and Queen Louise. From his earliest years he received military training, and as early as 1814-'15 fought in the campaigns against Napoleon. He provoked the enmity of his people by his opposition to constitutional reform, to the extent of having to flee from the country at the beginning of the revolution of 1848. In 1849 he was in command of the army which crushed the uprisings in the Palatinate and Baden.

He became king of Prussia in 1861, and with the aid of his powerful minister, Bismarck, grew steadily in power. War against Denmark in 1864 was followed by war against Austria in 1866 and against France in 1870. The outcome of these conquests, in which William himself led the Prussian armies, was the consolidation of the German states into the empire whose aggressive forty years later involved the whole world in war (see GERMANY; WORLD WAR). It is an interesting fact that in 1919 German representatives signed a drastic peace treaty within one hundred feet of the spot where William I was crowned emperor. See VERSAILLES, TREATY OF.

WILLIAM II, in German, **WILHELM II** (1859-), the last king of Prussia and last German emperor, a monarch who rose to supreme heights of power and influence, but who became the most hated man in the world, suffering humiliation and dishonor after a reign in which Germany became one of the great world powers.

The career of this last William of the House of Hohenzollern is one of the most spectacular and one of the most tragic in history. He ascended the throne on June 15, 1888, at the age of twenty-nine, the successor of his father, Frederick III, who had reigned only three months. His mother was Victoria, princess royal of Great Britain, the sister of King Edward VII. The young emperor began his reign with a definite conception of the dignity of his office. Like his grandfather, William I, whom he revered, he believed in the divine right of kings, and almost from the outset of his imperial career there was friction between himself and his strong-willed Chancellor, Prince Bismarck. The resignation of the latter, in March, 1890, was the first striking evidence of the determination of the new ruler to exert his authority as he chose.

Notwithstanding his autocratic habit of mind, William II did much for Germany. The empire became industrially the most highly-developed country on the continent, and its expansion as a commercial nation was no less striking. Through his efforts Germany secured important holdings in Africa, Asia and the Pacific islands, and became a great colonial power. At the same time it developed into the greatest militarist nation in the world, through a system of universal service, planned and carried out with precision and iron discipline. The kaiser, as he was commonly called, took the greatest pride and delight in his finely-trained army, and there is no doubt that he had visions of its going into action some day to give Germany its "place in the sun." The navy, too, was built up and made second in strength to that of Great Britain. The influence of the kaiser was so manifest in all



WILLIAM II

of this military and naval activity that he was called the "war lord of Europe." Apparently, however, he sought to cultivate only the friendship of the other nations.

The energetic German ruler was not without opposition in the empire, though he was very popular with the people as a whole. His obstinate hostility to electoral reform and his medieval conception of the kingship as a divine institution antagonized the Social Democrats, and between them and the emperor there developed a bitter feud. The emperor sought to quiet political discontent by securing good living conditions for the working people, and by such reforms as health insurance, old age pensions and the like. The Socialists refused to be diverted from their main issue, that of securing political equality for all, and to his discontent they greatly increased in numbers.

The outbreak of the great war in 1914 focused the attention of the world on Germany's emperor. The power to declare a defensive war was vested with him, and he insisted that it was in defense of the Fatherland that he signed the decree mobilizing the army. The course of events subsequent to the outbreak of the war tended to disprove this statement, and the consensus of opinion later was that he regarded the Austro-Serbian episode as an opportunity for Germany to expand territorially and commercially. A short victorious war restricted to Central Europe would put down the Pan-Slavic agitation, crush Serbia, check Russia and lay the foundation for German supremacy in the Balkan states and, eventually, in Asia. William II's ambition overreached itself. In striving to bring about German world dominion he accomplished Germany's humiliation—the loss of its colonies, its fleet, portions of its European territory and, most serious of all, the regard of the world. Justly or not, the brutalities practiced by the German forces on land and sea roused tremendous feeling against the once-honored emperor, and he reaped a whirlwind of scorn and hatred.

When the German people found that defeat faced them, they revolted and demanded new leaders. On November 28, 1918, seventeen days after his armies had demanded an armistice to save them from annihilation, William II signed a formal document of abdication, having previously sought refuge in Holland. He was received at the castle

of Count Goddard Bentinck at Amerongen, where he remained in retirement for several months. In January, 1920, the allied powers demanded that the former emperor be delivered to them for trial for war offenses. Holland refused to surrender him. In April, 1921, the kaiser died and was buried in Germany. See GERMANY.

WILLIAM I, PRINCE OF ORANGE, COUNT OF NASSAU, called **THE SILENT** (1533-1584), founder of the Dutch Republic. He was brought up in the Catholic religion, although both his parents were Protestants. In 1544 he inherited from his cousin the principality of Orange and large estates in the Netherlands. Under Charles V he served as commander of the army of the Netherlands and governor of Holland, Zealand and Utrecht. Philip II employed him in various offices, without, however, really trusting him.

When the duke of Alva entered the Netherlands, William withdrew to Germany. His first open resistance to Spain was an invasion of Brabant in 1568. This was unsuccessful, and a second attempt in 1572 met with no better fate. William had been before this time chosen stadtholder by Holland, Utrecht, Zealand, Gelderland and Overijssel, and in 1576 he succeeded in bringing about the "pacification of Ghent," whereby the southern provinces united with the northern, to expel the Spaniards and secure religious liberty. The southern provinces shortly broke away from their allegiance to William, but in 1579, by the Union of Utrecht, the seven northern provinces, Holland, Zealand, Gelderland, Friesland, Utrecht, Groningen and Overijssel, were formed into a league, which two years later formally deposed Philip and declared itself a republic with William as hereditary stadtholder. A price had been set by the king of Spain on William's head, and several unsuccessful attempts were made to assassinate him; a few years later he was shot at Delft.

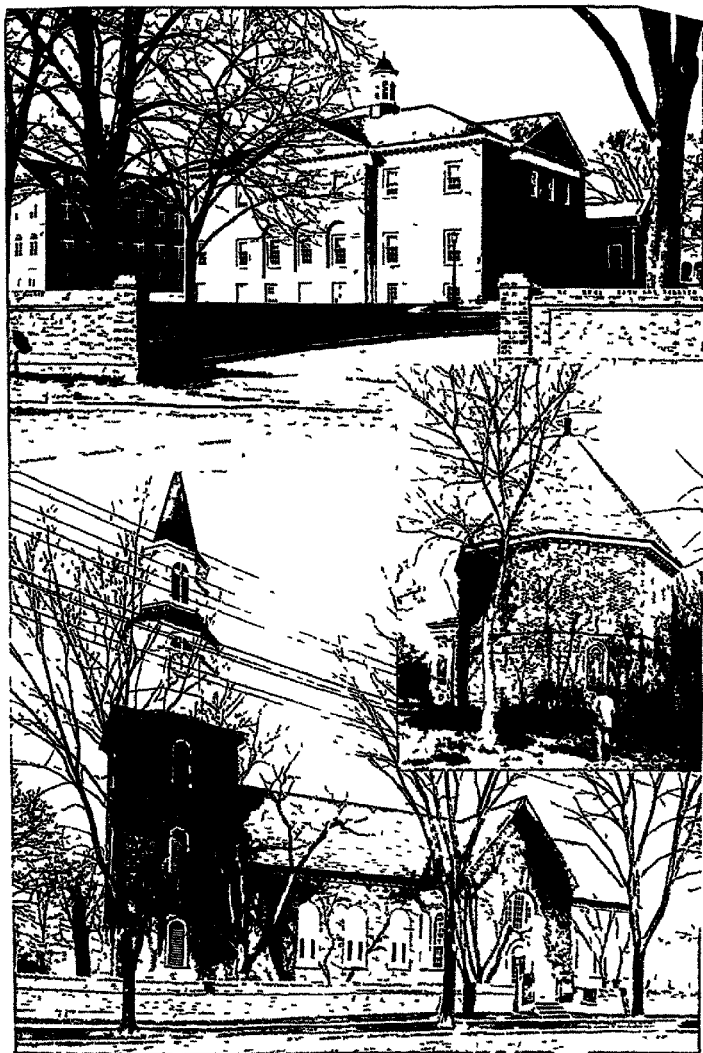
WILLIAM AND MARY COLLEGE, an institution of higher learning at Williamsburg, Va., next to Harvard the oldest in the United States, having been founded in 1693. It was named in honor of the reigning king and queen of England, and, endowed by the government, soon attained prosperity. It suffered heavily during both the Revolution and the Civil War, and for a period between 1881 and 1888 it was so crippled financially that it had to close its doors. But in 1888 a

state appropriation enabled it to reopen, and an indemnity of \$64,000, granted it by Congress in 1893, for its losses in the Civil War, put it again on a firm foundation. The college offers two courses, a collegiate and a normal course. It has about 400 students and about fifty instructors. Women were admitted to all college courses for the first time in 1918.

WILLIAMS, JOHN SHARP, (1854-1932), an American statesman, born at Memphis, Tenn. He studied at the Kentucky Military Institute at Frankfort, the University of the South, the University of Virginia and the University of Heidelberg. He was admitted to the Tennessee bar in 1877, and in the following year removed to Yazoo City, Miss., where he practiced law and also became a planter. Taking an active part in Democratic politics, he was elected to Congress in 1893 and served continuously for sixteen years, becoming the leader of the Democratic party in the House. In 1911 he was elected Senator from Mississippi and was reelected in 1917.

WILLIAMS, ROGER (1604-1683), a Puritan divine, founder of the colony of Rhode Island, born of Welsh or Cornish parents. He attended the Charter House School and the University of Cambridge. Because of his Puritan beliefs he emigrated in 1631 to New England. There he became pastor of a church at Salem, but his extreme views regarding the jurisdiction of the civil magistrate caused him to be banished from the colony of Massachusetts, and he went with a few companions to Rhode Island and founded a settlement, which he called Providence. Here he formed the first Baptist church in America. He was twice in England, in connection with a charter for the colony, and there he made the acquaintance of Milton and other prominent Puritans. He published *A Key into the Language of the Indians of America*, *The Bloudy Tenent of Persecution for the Cause of Conscience*, *The Bloudy Tenent yet more Bloudy* and *George Foxe Digged out of His Burrowes*.

WILLIAMSBURG, VA., the county seat of James City County, forty-eight miles southeast of Richmond, on a peninsula between the James and York rivers and on the Chesapeake and Ohio railroad. The town is one of the oldest in the United States. It was settled in 1632, became the capital of Virginia in 1698, and was the first city



Kerstens View

IN HISTORIC WILLIAMSBURG

The College of William and Mary, built in 1693 The Powder Horn, erected in 1732 for the storage of powder and ammunition for Virginia Colony The oldest Episcopal church in America in continuous use, it dates from 1710-1715, and is on the site of two former churches, erected in 1674 and 1683



VISCOUNT WILLINGDON

Governor of Bombay, 1913-1919

Governor of Madras, 1919-1924

Governor-General of Canada, 1926-1931

Viceroy of India, 1931-1936

in the state to receive a charter (1722) William and Mary College, the second oldest college in the United States, established here in 1693, is still the chief feature of the city. There are also the Eastern State Hospital for the insane, erected in 1769, and the Williamsburg Female Institute. The courthouse dates from 1769. In 1928 John D. Rockefeller Jr. provided a fund of \$5,000,000 to be used in restoring this historic pre-Revolutionary town to the condition in which it existed in colonial days. This work was completed within a few years. Population, 1930, 3,778.

WILLIAMS COLLEGE, a nonsectarian school for men at Williamstown, Mass., which developed from a free school established by Colonel Ephraim Williams. The funds donated by the colonel, who was killed in 1755, were invested and not used until 1793, when the school was chartered. The college has a faculty of over sixty members, an average attendance of about 700 and a valuable library containing about 105,000 bound volumes and 17,000 pamphlets. The prosperity and high rank of the institution are largely due to the work and influence of Mark Hopkins, who was its president from 1836 to 1872. Among the well-known men who attended Williams are William Cullen Bryant, President Garfield and his son Harry A. Garfield. The latter was president of the college from 1908 until 1934, except for the period of the World War, when he served as fuel administrator.

Williamstown is in Berkshire County, five miles west of North Adams. In 1930 it had a population of 3,900.

WILLIAMSPORT, PA., the county seat of Lycoming County, ninety-five miles northwest of Harrisburg, on the West Branch of the Susquehanna River and on the Pennsylvania, the Philadelphia & Reading and the New York Central railroads. There is an airport. The city is in an agricultural, mining and lumbering section. Its industries include numerous lumber mills, clothing factories, steel works, furniture factories and manufactories of rubber goods, motors, gasoline engines, valves, pumps, dyes, wire rope, shoes, silks and sewing machines. Among the prominent buildings are a city hall, a Federal building, the James V. Brown Library, a state armory, two hospitals, a home for the friendless and a Masonic Temple. The Dickinson Seminary is located here.

The place was settled in 1779, and chartered as a city in 1866. It is governed by a council and mayor. Population, 1920, 36,198; in 1930, 45,729.

WILLIMANTIC, Conn., one of the county seats of Windham County, sixteen miles northwest of Norwich, at the confluence of the Willimantic and the Natchaug rivers. Willimantic is popularly known as the "Thread City," the manufacture of thread being its principal industry. Other manufactures are silk goods, cotton prints and twills, plumbers' supplies, boxes and fine machinery. Many factories are run by water power. A state normal school is located here, also a state armory. The city has a Federal building and two libraries. It was settled about 1822, was incorporated as a borough in 1833, and was chartered as a city in 1893. Population, 1920, 12,330, in 1930, 12,102.

WILLINGDON, Viscount (1866-), Governor-General of Canada, appointed in 1926 to succeed Lord Byng. Educated at Eton and Cambridge, he began his official life in Australia, and from 1905 to 1912 he was junior lord of the British Treasury. After 10 years in the House of Commons, in 1910 he was created First Baron of Raton, in 1924 Viscount Willingdon, and in 1935 a marquis. From 1931 to 1936 he held the post of Viceroy of India.

WILLIS, NATHANIEL PARKER (1806-1887), an American author, born at Portland, Maine, educated at Andover and at Yale. During his college days he attracted some attention with his verse, and after graduation was employed by S. G. Goodrich to edit *The Legendary* and *The Token*. The *American Monthly Magazine*, from its establishment to its consolidation with the *New York Mirror*, was under his control. Willis traveled for some years as correspondent of the *Mirror* in France, Italy, Greece, Turkey, Asia Minor and England. After his return to America, he conducted several journals, most of which were short-lived. His works include poetry, travel and society sketches, in all of which he displays a facile style.

WILLY-O'-THE-WISP. See IGIS FARTUS.

WILLOW, willow, a group of trees and shrubs common in the cold and temperate regions of the northern hemisphere, with a few representatives in Australia and some of the islands of the Southern Pacific. All thrive in moist ground, and are most common

on the banks of streams and ponds and in marshes. The alternate leaves are long, slender and pinnate, these are preceded by flowers in the form of catkins. The catkins, which are clothed with long, glossy hairs, are popularly known as *pussy-willows*. On account of the flexible nature of the shoots of many species and the toughness of their wood and fibers, they have always been used as materials for weaving baskets, hoops and crates. Baseball bats, hoe handles and many similar articles are made from the wood of the white willow, and wooden shoes, pegs and other small objects are constructed from other species. The *weeping willow*, which is a native of China, is a fine ornamental tree that is often planted in parks.

WILMINGTON, DE., the largest city in the state and the county seat of New Castle County, is 27 miles southwest of Philadelphia, on the Delaware River, at the Junction of the Christina and the Brandywine rivers, and on the Baltimore & Ohio, the Reading and the Pennsylvania railways. Three principal bus lines and many smaller ones serve the city. The municipal airport, Bellanca Field, is six miles distant, Buck Airport and two landing fields are nearby. There are in operation about 190 industries; their leading activities are the production of braided rubber, cotton dyeing and finishing and particularly vulcanizing fiber. The city is the headquarters of immense leather, powder and paper factories. A magnificent marine terminal accommodates coastwise and oceanic trade.

Iréné Elenthere du Pont de Nemours in 1802 began the manufacture of powder on the Brandywine near Wilmington. His factory became and has remained the largest powder factory in the country.

Among educational institutions are the Friends' School, Beacom College, Goldey College, the Ursuline Academy and two business colleges. The state university is 14 miles away. The public library has nearly 200,000 volumes. Holy Trinity Church, built by the Swedes in 1698, is said to be the oldest church in continuous occupation in the nation. Some of the charitable institutions are the industrial school for girls and a similar school for boys, the four hospitals, a home for friendless children, Saint Peter's Orphanage, Saint Joseph's Home; two homes for the aged and the state hospital for the insane. Prominent buildings include the

courthouse, the custom house, the state armory, and the Federal building.

Wilmington was first settled by the Swedes under Peter Minuit in 1638. It was taken by the Dutch in 1655, and they in turn were succeeded by the English in 1664. It fell into decline until Thomas Willing laid out the streets in 1731. William Penn landed at a nearby point in 1682. The original First Presbyterian church was erected in 1741. General George Washington occupied headquarters in the city during the battle of the Brandywine. The charter for the borough was issued by William Penn in 1739. The city charter dates from 1832. The first iron steamship constructed in the United States was built here in 1836. The founder of the du Pont de Nemours family, manufacturers of powder, died near Wilmington in 1817. Population, 1930, 106,597.

WILMINGTON, N. C., the county seat of New Hanover County, 148 miles southeast of Raleigh, on the Cape Fear River and on the Seaboard Air Line and the Atlantic Coast Line railroads. The city maintains one airport. This is the state's only developed deep water port and it has splendid facilities for commodity distribution both by rail and water. Wilmington is the center of a productive agricultural and trading area, with a growing season of 255 days between frosts, so that four crops annually can be raised. The temperature averages 60° in winter and 78° in summer.

Buildings and institutions of importance are the public library, the county museum, customs house, three hospitals, the Wilmington Law School, the Federal building, a house of correction and a home for aged women. There are seven parks and playgrounds, of these Greenwood Lake and Park are of rare beauty.

The city was founded in 1730 and was incorporated in 1866. The Stamp Act resistance in 1765 here antedated the Boston Tea Party by eight years. The city has adopted the commission form of government. Population, 1930, 32,270.

WILMOT PROVISIO, *pro visio*, an amendment presented in Congress in 1846 to a bill providing for the purchase of territory from Mexico. It was offered by David Wilmot, a Democrat from Pennsylvania, and provided that "neither slavery nor involuntary servitude shall ever exist in any part of such territory, except for crime whereof the party

shall first be duly convicted." The amendment was adopted in the House, but did not come to a vote in the Senate, and in the next Congress the bill was finally passed without the amendment.

The debate in Congress over the question resulted in a breach between Northern and Southern Democrats, which led to the adoption by that party of the doctrine of popular sovereignty. This in turn resulted in the withdrawal of many Northerners, who joined the Free-Soilers and later became prominent in the Republican party.

David Wilmot (1814-1868), an American politician and jurist, born at Bethany, Pa. He was admitted to the bar in 1834 and began his practice at Towanda. He became a prominent Democrat and served in the House of Representatives from 1845 to 1851. There he opposed the extension of slavery into the territory acquired from Mexico and was the sponsor for the famous Wilmot Proviso. He later joined the Republican party, was an unsuccessful candidate for governor of Pennsylvania in 1857, served in the Senate for two years (1861-1863), and thereafter was judge of the United States court of claims.

WILSON, AUGUSTA EVANS (1835-1909), an American novelist, born at Columbus, Ga. In 1868 she married a Mr. Wilson and afterwards lived at Mobile, Ala. Her books are sentimental, but harmless, and make a wide appeal. They have retained a greater popularity over a longer period than the collected works of any other American novelist. The titles are *Ines*, *A Tale of the Alamo*, *Beulah*, *Macaria*, *Saint Elmo*, *Vashti*, *Infelice* and *At the Mercy of Tiberius*.

WILSON, HENRY (1812-1875), an American statesman, born in Farmington, N. H. His original name was Jeremiah Jones Colbrath, but he abandoned the name upon reaching manhood. He was first employed on a farm, later he learned the shoemaking trade, earned money to pay for an academic education and finally engaged in the manufacture of shoes at Natick, Mass. In 1840, as the "Natick cobbler," he addressed political meetings, winning wide fame, and in that year he was elected to the Massachusetts legislature. In 1848 he began to edit the *Boston Recorder*, as a Free-Soil organ. In 1855 he was chosen United States Senator, as a Free-Soiler or Know-Nothing, to succeed Edward Everett. His speeches against slavery are among the most important of the period. He served for

a short time on the staff of General McClellan in the Civil War. In 1872 he was elected Vice-President, on the ticket with President Grant, but died before completing his term.

WILSON, JAMES (1742-1798), a native of Scotland, an emigrant to the American colonies in 1766, an eminent patriot and a signer of the Declaration of Independence. He became a member of the Colonial and Continental congresses, and also of the Constitutional Convention of 1787. His speech in the Pennsylvania convention later secured the ratification of the Constitution by that state.

WILSON, JAMES (1835-1920), an American statesman and administrator. He was born at Ayrshire, Scotland, and emigrated to America at the age of seventeen. He attended Iowa College, engaged in farming and later entered the state legislature, of which he became speaker. From 1873 to 1877, and from 1883 to 1885, he was a member of Congress. At different times he was regent of the University of Iowa, director of the Agricultural Experiment Station and Professor of Agriculture at the Iowa Agricultural College. In 1897 he became Secretary of Agriculture, remaining in that post sixteen years, a longer term than any other cabinet member has ever served.

WILSON, JOHN (1785-1854), a Scottish poet and essayist, better known as "Christopher North." He was born at Paisley, Scotland, educated at Glasgow University and at Oxford and on leaving college settled on an estate on Lake Windermere, where he gave himself up to literary work. Wordsworth, Southey and Coleridge were among his acquaintances. His first independent publication was a poem called *The Isle of Palms*, and this was followed by *The City of the Plague*, a second book of poems. When *Blackwood's Magazine* was established, in 1817, Wilson became one of its contributors, and for many years he wrote some of the most notable articles in that periodical. In 1820 he was appointed to the chair of moral philosophy in Edinburgh University, a position which he held for thirty-one years.

Most famous, perhaps, of the writings of Wilson are the *Noctes Ambrosianae*, which abound in graceful humor and sentiment. Among his other works are three novels, *The Lights and Shadows of Scottish Life*, *The Trials of Margaret Lyndsay* and *The Foresters*.



WILSON, [THOMAS] Woodrow (1856-1924), an American educator, writer and statesman, the twenty-eighth President of the United States, and the only Democrat to serve two consecutive terms since Andrew Jackson. His administrations are linked with such stupendous changes in domestic and international history, and events and

problems of such vast import confronted him almost from his first inauguration, that it is difficult to arrive at a just estimate of his place in history. No man of outstanding importance can be properly judged by his own generation, but, even though there is lacking the necessary perspective of time, it is clear that he ranks with the greatest of American Presidents. A man of deep sympathy for the workers of all nations, he stirred the masses by his remarkable state papers as no other statesman has moved them, and it is not an exaggeration to say that his writings have been read and quoted more widely than those of any other public leader of his time.

It happened that the greater part of his administrations ran parallel with a terrible world struggle in which traditions, laws and organizations centuries old were swept away. Into the tide of war America was drawn, under the leadership of Woodrow Wilson, who had been called pacifist and impractical idealist by those out of sympathy with his methods and policies. Yet it was this peace-loving President who held the nation almost a unit through the anxious days of the war, who brought new inspiration to the war-weary masses in the allied countries, and who broke down the iron discipline of the subjects of the German emperor by his insistence on America's just aims in fighting.

President Wilson's fame as the spokesman of the allies and interpreter of American ideals is unquestioned. Whether the world was ready for the acceptance of his principles and whether the foundations of a lasting peace were laid in the treaty he helped to frame, time alone can tell, but it is certain that he had a decisive part in bringing the war to a close. For this achievement he must remain a great world figure.

Early Life. Both of the grandfathers of Woodrow Wilson were born in the British Isles. His mother's father, Thomas Woodrow, was a Scotch Presbyterian clergyman who at one time preached in a small church in Carlisle, England. Subsequently he went as a missionary to Canada, and eventually held a pastorate in Chillicothe, Ohio. The paternal grandfather, James Wilson, was an Ulsterman of County Down. He emigrated to America in 1807, and became a successful printer and newspaper owner in Pennsylvania. Joseph Ruggles Wilson, the youngest son of James Wilson and the father of the future President, was a well-known educator and a distinguished clergyman of the Presbyterian Church, South. He held several professorships in Southern colleges, and was pastor at various times in three different states. While Dr. Wilson was preaching in Staunton, Va., his third child and first son, Thomas Woodrow, was born, on December 28, 1856. The boy was taught at home until his ninth year, and in 1873, when a lad of seventeen, he entered Davidson College, N. C. Before the end of the first year he left school because of ill health, and when he reentered college, in 1875, he registered at Princeton.

Woodrow Wilson (the name Thomas he never used) was active in the university debating and literary circles, was managing editor of *The Princetonian* in his senior year, and won other honors as an undergraduate. He was graduated with the class of 1879, entered the law school of the University of Virginia, where he remained a year, and in 1882 began the practice of law in Atlanta, Ga. At college he had been keenly interested in the study of political science, and had read voluminously on the subject. As a young lawyer he found that study was more absorbing than the trying of cases, and in the course of a year he abandoned his practice to become a postgraduate student at Johns Hopkins University. Here he specialized in government and jurisprudence.

Career as Educator. In 1885 Wilson received his doctor's degree, having submitted as his thesis a book that is now a standard classic in its field—*Congressional Government. A Study in American Politics*. It is an interesting fact that the theories which the young man worked out in this small volume were consistently applied by him years later as Governor of New Jersey and as President of the United States. In his thesis he de-

clared that the method of preserving balance in governmental functions by having the legislative and executive administrations act as a check upon each other was weak in that it did not provide for effective leadership. His idea was that the executive should assume the official leadership and since government by political parties had become a fact, that the President should be not only the leader of the people as a whole, but the head of his own party.

It was many years before Wilson had the opportunity to put these theories to a test. For a quarter of a century after leaving Johns Hopkins he rose steadily to distinction as an educator. From 1885 to 1888 he was associate professor of history and political economy at Bryn Mawr College, and from 1888 to 1890 held a similar position at Wesleyan University, Middletown, Conn. While at Wesleyan he published *The State*, another classic on political science, an analysis of the governments of various nations. This book has been widely used as a text in colleges and universities.

Wilson was offered the professorship of jurisprudence and political economy at Princeton in 1890, and in that year began an association with his alma mater that was to last twenty years. In 1902 he succeeded Dr. Francis L. Patton as president of the university. He had been remarkably successful as a teacher, partly because of his scholarship and grasp of his subject, and partly because of his attractive method of presenting it. His career as head of the institution was no less successful.

Among the several reforms inaugurated by Wilson as head of the university, the most radical was the introduction of the preceptorial system. About fifty preceptors were added to the faculty for the purpose of bringing about a closer relationship between the students and the teaching force. New professors distinguished in special fields were also brought to the institution, the equipment was enlarged and improved, and large endowments for the graduate school were secured. One attempted reform of the president met with opposition that defeated it—the plan of doing away with the exclusive senior-junior clubs in the interest of greater democracy in university life. On the whole, however, Wilson's record was sufficiently brilliant to make him a prospective nominee for governor in 1910.

In Politics. New Jersey was a Republican state, and the president of Princeton was a Democrat, but a long period of "boss" government had created a popular demand for a higher type of official, and when the Democratic convention nominated Wilson the liberal elements of all parties could approve the choice. The Democratic candidate set a new standard of campaigning, for he presented a progressive, straightforward platform and refrained from abusive personalities. Elected by a plurality of 48,056, in a state that had been Republican for sixteen preceding years, he carried out his program as he had outlined it.

As governor he showed exceptional qualities of leadership, guiding through the state legislature a number of measures designed to remedy various political and economic evils. When he met with "machine" opposition he did not hesitate to appeal to the people over the heads of the politicians, and in 1911, by a speaking tour through the state, he defeated the efforts of the machine to override the primary vote for James E. Martine, candidate for United States Senator. A record like this naturally made him a national figure in politics, and people began to study his career.

As the Presidential campaign of 1912 drew near the progressive governor of New Jersey was prominently mentioned as a candidate, and in the Democratic national convention which met at Baltimore, Md., he was nominated after a somewhat protracted contest. His chief opponent, Champ Clark of Missouri, had the backing of the conservative elements, but the fight for Wilson's nomination was led by William Jennings Bryan, still a powerful leader, though three times defeated for the Presidency. Public opinion veered strongly in favor of the New Jersey candidate in the closing hours of the convention, and his nomination was accepted with hearty approval by the rank and file of the party. The Republicans had split into two camps, which made the election of Wilson almost a foregone conclusion. His campaign, however, strengthened the favorable impression he had made, especially as he refused to be drawn into personal arguments. With Thomas R. Marshall of Indiana as his running mate, he carried forty states and received 435 electoral votes. The popular vote stood 6,286,214 for Wilson; 4,126,020 for Roosevelt; 3,383,923 for Taft.

As President. During the administration of President Taft, Wilson's immediate predecessor, popular feeling had run high against the Republicans because of their refusal to "revise the tariff downward." In the Congressional elections of 1910 the Democrats had gained control of the House, and through the Republican split of 1912 they secured a working majority in the Senate, besides increasing their strength in the lower body. The President therefore began his administration with a congress composed largely of his own political faith. His legislative program, among other things, called for a new tariff law, a revision of the banking laws and stricter regulation of private monopolies. The tariff was first disposed of.

Congress (the Sixty-third) was called in special session on April 7, 1913, primarily for the purpose of framing a new tariff law. President Wilson excited much comment by appearing personally before the assembly and reading his message himself, a practice which had been abandoned after the administration of John Adams. Representative Underwood of Alabama and Senator Simmons of North Carolina had charge of the framing of the bill, which, after weeks of debate, was signed on October 3 by the President, who more than once was forced to exert pressure to push it through. The bill brought about a general reduction of duties on a long list of commodities.

Meanwhile, during the debate on the tariff, important preliminary work was being done on the revision of the banking laws, and when the tariff was out of the way Congress took up the debate of the Glass-Owen, or Federal Reserve Act. The foundation for this legislation had been laid by the Monetary Commission created in 1908. The act was passed in December by the regular session of Congress, and received the President's signature on December 23 (1913). It was in some respects one of the most important pieces of domestic legislation enacted since the Civil War, and its passage reflected favorably on the President's powers of leadership and his broad statesmanship.

After the midwinter recess Congress re-assembled on January 20, 1914, and heard the President's message on anti-trust legislation. Two important laws followed—the Clayton Anti-Trust and the Trade Commission acts. By the former, interlocking directorates were made illegal, the latter

created a commission with powers over corporations similar to those exercised over the railroads by the Interstate Commerce Commission. Another important piece of legislation was the repeal of the act exempting American coastwise shipping from paying tolls at the Panama Canal. The President used his influence in favor of this repeal because he held that the act violated American treaty agreements with Great Britain. Meanwhile vexatious international questions were beginning to confront him.

Trouble with Mexico. Shortly before President Taft went out of office, Madero, the deposed President of Mexico, was murdered, presumably by the orders of Huerta, who had led a revolution against him. Taft had refused to recognize the Huerta régime, and this policy was maintained by Wilson, who, in a special message to Congress in December, 1913, declared that stability in Mexico was dependent upon the downfall of Huerta. It was the general policy of the Wilson administration to discourage revolutions in the Latin-American republics by refusing recognition to usurpers. The Mexican problem, however, seemed to offer no solution. Some Americans favored active intervention to protect American lives and property in the troubled country, and these bitterly criticized the President for maintaining a policy of watchful waiting. Wilson, who fully realized the consequences of sending an army to "clean up" the country, and the adverse effect it would have on South American republics, too often suspicious of American motives, refused to do more than lift the embargo on the shipment of arms into Mexico, where a counter-revolution against Huerta was being carried on by Carranza and Villa. Circumstances, however, forced his hand.

In April, 1914, several American marines were arrested at Tampico by Mexican officers. Rear-Admiral Mayo, the American commander, demanded that the Americans be released and that Huerta formally apologize and order a salute to the American flag. Complications arose over Huerta's refusal to salute the flag, and the President on April 20 asked and received from Congress authority to use the naval and military forces of the United States to enforce the demand. Vera Cruz was occupied by American forces, but open hostilities were averted by an offer of mediation on the part of Argentina, Brazil and Chile (the "A B C" powers of South Amer-

ues) While an arbitration commission was in session at Niagara Falls, the situation was cleared by the resignation of Huerta.

After an interval Carranza succeeded in setting up a provisional government, which President Wilson formally recognized on October 19, 1915. Meanwhile, the World War in Europe had broken out (August, 1914), and Villa, who had quarreled with Carranza, was increasing the state of disorder by bandit raids against Mexicans and Americans alike. Matters came to a climax in March, 1916, when the town of Columbus, N. M., was raided at night by about 1,500 *Vulturas*. Property was destroyed and several Americans were killed, the news of which made the people of the United States hot with indignation.

President Wilson called out the militia to guard the border, and an expedition under Pershing advanced into Mexico for the ostensible purpose of getting Villa, "dead or alive." Carranza maintained a hostile attitude toward the enterprise, and the utmost caution was preserved by the Americans to prevent a clash between the two governments. The public, many months later, learned that German intrigue was responsible for much of Villa's activity, and the wisdom of the administration's course was vindicated. In February, 1917, the expedition returned home, where a greater crisis was to be met.

America and the War in Europe When the great war broke out in 1914 the majority of Americans breathed a sigh of relief that three thousand miles of water lay between them and the scene of struggle, and the President's proclamation of neutrality was generally accepted with approval. But neutrality was a most difficult thing to maintain. The great majority of American citizens of German blood found themselves openly sympathetic with Germany, and began to resent the shipment of supplies to the allied nations, because allied control of the seas made like shipments to Germany impossible.

On the other hand, large numbers of Americans who had no ties overseas began to feel stirrings against Germany. The invasion of Belgium was something that could not be talked away, and as the war progressed and appeals for help came from the areas devastated by German forces this hostile feeling deepened. When the liner *Lusitania* was sunk by a submarine, in May of 1915, and the

people read that over one hundred American lives were lost, there was open talk of joining the allies. The President, however, refused to be moved by the extremists on either side. Instead of suggesting war he bent his energies toward forcing Germany to keep its submarine warfare within the rules of international law and humanity, and he would not yield to the German and pacifist propaganda for an embargo on supplies to the allies, as he rightly held that such a course would be a violation of American neutrality.

The Campaign of 1916 In the summer of 1916 President Wilson and Vice-President Marshall were unanimously nominated to succeed themselves by the Democrats convention which met at Saint Louis. The Republicans nominated Charles Evans Hughes and Charles W. Fairbanks. The campaign lacked the dramatic elements of the fight of 1912. The Democrats asked for Wilson's reelection because of his record for constructive legislation, and his tactful handling of the international problems, which had "kept the country out of war." The Republicans vigorously attacked the domestic and foreign policies of the administration, but they failed to convince the country that a Republican régime would do any better.

President Wilson's personality had made a tremendous impression. He was criticized by his enemies as being vacillating and inconsistent, but there was a widespread feeling among the people that the man who occupied the executive chair had always acted from high motives, had never permitted dictation to him, and could be trusted further with the affairs of the nation. The contest was close. Though Wilson increased his popular vote over that of 1912 by nearly 3,000,000, he won by an electoral vote of 277, only twenty-three more than Hughes received. The outcome was not definitely known for several days after the election. The Democrats made heavy inroads in normally Republican states, especially in the West.

The Nation at War Toward the close of 1916 President Wilson published a note requesting that the warring countries of Europe state the precise objects for which they were fighting. To this suggestion both groups of belligerents responded, the allied reply being by far the more specific. With the allied and German replies as a basis, the President addressed the Senate on January 22, 1917. He told his auditors that the United States

would be forced to play a part in the establishment of a durable peace, and that such a peace would be based on "equality of right among great and small nations" and upon "the freeing of subject people." Many people thought that the President was paving the way for an offer to mediate between the two groups of belligerents, but all hopes for peace were abandoned when the German government announced, late in January, that unrestricted submarine warfare would be started on February 1.

This announcement meant that the President's efforts to keep peace by diplomacy had failed. Unhesitatingly he broke off relations with Germany, and on April 6, 1917, signed the Congressional resolution that made the United States an associate with the allies in the great World War. (Details on the events leading up to this resolution and an account of the part America played in the war, both at home and abroad, will be found under the headings UNITED STATES and WORLD WAR.)

The unanimity with which the American people rallied to the support of the administration in this crisis surprised the most optimistic. President Wilson's qualities of leadership never appeared to better advantage than during the nation's participation in the war. He had the confidence of the people as a whole, regardless of party, and his war utterances, magnificent in spirit and couched in inspiring language, stirred America to a high plane of patriotism and devotion. His message caught the ear of the masses in Europe, weary and heart-sick over the cruel prolongation of the war, and gave them new courage. Germany listened, too.

During the period of negotiations in the fall of 1918, when Austria and Germany were making proposals for peace, President Wilson was the spokesman for the allies, and at the time the armistice was signed, on November 11, he was probably the most talked-of statesman in the world. It is a remarkable fact, however, that a week before this supreme climax of the war, the American people had elected a new Congress in which the Democrats had been repudiated and Republicans were in the majority, and had voted thus in spite of a direct appeal from the President to send Democrats to Congress.

This appeal was widely misunderstood, and it had subjected Wilson to bitter attacks from his political opponents. It was wholly in keeping with his theory of the function of the

executive, which anyone may read in his thesis on *Congressional Government*. He conceives the executive as having a dual rôle—that of President of the United States and also head of the party he represents. Leadership should be exercised by the President, who must interpret the wishes of the people and be responsible to them. Efficiency is possible only when the President is backed by a Congress in which his own party is dominant. Naturally, to the average voter the appeal was only an act of partisanship, and it cost the President something in prestige. The Congress which was to work with him for the rest of his term was Republican by a margin of two in the Senate and of forty-three in the House.

America and World Peace With his usual disregard for precedent, the President announced that he would head the American delegation to the peace conference. In December he sailed for Europe, and so for the first time in American history a President visited a foreign nation during his term of office. Like many other acts, this one was greeted with storms of approval and of disapproval, but through it all the President went on his way, undisturbed by popular clamor. The other American delegates were Secretary of State Lansing, Henry White, diplomat, General Tasker H. Bliss, and Edward M. House, confidential adviser of the President.

With the exception of a brief interval late in February, when he returned home to sign bills passed by Congress, the President remained in Europe until the last of June. On his first trip he visited Italy and England, receiving there and in France extraordinary ovations from the people. He took a conspicuous part in the Paris discussions leading up to the treaty with Germany, signed the treaty on June 28 in the Hall of Mirrors, in the Palace of Versailles, and reached home early in July. The treaty was presented to the Senate on July 10, the President at that time addressing the Senators on the subject of the league of nations, which had been made an integral part of the treaty.

During the President's absence formidable opposition in the Senate had developed to the provisions of the league of nations as formulated in Paris. It was argued that the independence of the United States was jeopardized, that the right of Congress alone to declare war was imperiled, that the United

1913

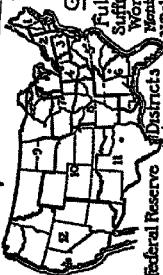
WILSON'S ADMINISTRATION

1921



Panama's

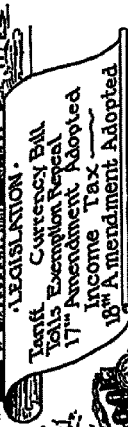
Canal Completed



Federal Reserve
see article

Banks and Banking

Panama-Pacific Exposition



LEGISLATION

Tariff Currency Bill

Tolls Exemption Repeal

17th Amendment Adopted

Income Tax

18th Amendment Adopted

OTHER EVENTS

Callaghan Japanese

Land Bill 1913

Floods in Ohio Valley 1913

Reich-Walden Reservoir

Act - 1913

Keokuk Dam Completed - 1913

Cape Cod Canal Completed

1914

Beginning of World War

1914

US Enters War

1917

President Reeves

Custom of Reading

Messages



Constitutionalist

Army Wins

Mexican

Revolution

Mexico

Mexico City

1913

1914

1915

1916

1917

1918

1919

1920

1921

"Doughboys"

in France

1914

1915

1916

1917

1918

1919

1920

1921

States would be drawn into petty European quarrels, that the Monroe Doctrine was menaced, etc. A long and bitter debate ensued, both in the Senate and among the people, but in the end the Senate refused to ratify the treaty and the league covenant. Wilson's health gave way under the strain, and when he gave up office in 1921 he was a sick man. He continued to reside in Washington as a private citizen, and kept up his interest and exerted his influence constantly in the cause of international peace. But physical strength did not return, and he died in Washington on February 3, 1924, and was buried in the crypt of Bethlehem Chapel. It was said of him that "he elevated the war into a moral crusade for the deliverance of oppressed peoples and for the destruction of an outworn social order." His legacy to America was a stronger sentiment for international cooperation and good will.

Other Events. International affairs had so prominent a place in the Wilson administrations that they obscured many events of domestic interest. Two amendments to the Constitution became effective, the XVIIIth (1913), providing for the direct election of Senators, and the XVIIIth, making illegal the sale and manufacture of alcoholic liquor. The XIXth amendment, enfranchising women, was adopted by Congress in 1919 and submitted to the state legislatures for ratification; by September, sixteen states had ratified it. On July 1, 1919, the United States became temporarily a "dry" nation, in accordance with the terms of a war measure designed to conserve foodstuffs. The prohibition era was scheduled to last until the army was declared demobilized, the prohibition amendment not becoming effective until January 16, 1920.

Several other experiments were tried by the nation in this remarkable period of change. The government took control of the railroads, the telephone and telegraph systems and the cables, and operated them for varying intervals. Because of unsettled conditions it was difficult to judge adequately of the advisability of permanent government ownership. Another innovation was the establishment of daylight saving by moving all the clocks forward one hour on the last Saturday in March and returning to standard time in October. The plan was adopted in March, 1918, it resulted in a great saving of fuel and was considered a

boon by city dwellers, who enjoyed thereby an extra hour of light at the close of day. Farmers opposed the system and an attempt was made to repeal the law during the special session of the Sixty-sixth congress. President Wilson vetoed the bill for the repeal; at that time there were not sufficient votes to override his veto, but repeal was accomplished in August.

Except for a few months after the outbreak of the World War, the United States enjoyed great prosperity during the Wilson administration. Business flourished, crops were large, and the Federal Reserve system kept financial conditions steady. To offset these favorable items were the high cost of living and unsettled labor conditions. Wages were high everywhere, but prices were correspondingly higher, and strikes for increases to meet advanced costs became alarmingly frequent during and after the war. The activity of radical elements who admired the Lenin régime in Russia also caused anxiety. Altogether, President Wilson was confronted by larger and more varied problems during his two terms than any other President since Lincoln. An event which caused general sorrow was the sudden death of Theodore Roosevelt, in January, 1919.

The White House Family. President Wilson was twice married. He and his first wife, Ellen Louise Axson, of Savannah, Ga., were married in June, 1885, at the close of his student days at Johns Hopkins. She died on August 6, 1914, a few days after the World War began. The second Mrs. Wilson, who had been Mrs. Edith Bolling Galt, became mistress of the White House on December 18, 1915. Mrs. Wilson accompanied her distinguished husband to Europe in 1919. The three daughters of President Wilson created much quiet interest among Americans. The eldest, Miss Margaret, is a singer of note, and is active in social welfare work. During the war she sang for the soldiers in a number of communities in Europe. Jessie and Eleanor Wilson were both White House brides, the former marrying Francis B. Sayre, and the latter William G. McAdoo, former Secretary of the Treasury.

Woodrow Wilson, Author. For distinction of scholarship and charm of style Wilson's writings have a high place, though they do not show great variety as to subject matter. His *Congressional Government* and *The State* have already been mentioned. In 1893

Administration of Woodrow Wilson, 1913-1921

I THE PRESIDENT

- (1) Ancestry
- (2) Birth
- (3) Education
- (4) Career as educator
- (5) Governor and President
- (6) Character
- (7) Writings

II GOVERNMENT AFFAIRS

- (1) Domestic
 - (a) Underwood Tariff Law
 - (1) Revised tariff downward
 - (2) Income tax provisions
 - (b) Federal Reserve Act
 - (1) Twelve Federal Reserve banks created
 - (2) Stabilized financial conditions
 - (c) Clayton Anti-Trust Act
 - (d) Trade Commission Act
 - (e) Repeal of Panama Tolls clause
 - (f) Seventeenth Amendment
 - (1) Direct election of Senators
 - (2) In force, 1913
 - (g) Eighteenth Amendment
 - (1) Prohibition of liquor manufacture and sale
 - (2) Effective January 16, 1920
 - (h) Nineteenth Amendment
 - (1) Women enfranchised
 - (2) Adopted by Congress in 1919
- (2) Daylight saving adopted
- (2) Foreign
 - (a) Mexico problem
 - (1) Refusal to recognize Huerta
 - (2) Tampico episode
 - (a) Occupation of Vera Cruz
 - (b) "ABC" mediators
 - (3) Villa raid on Columbus, N. M.
 - (a) Invasion by Pershing's troops

- (b) Withdrawal of troops

- (b) World War
 - (1) Neutrality maintained until 1917
 - (2) German aggressions against America
 - (3) Diplomacy of President
 - (4) Reflection of Wilson in 1918
- (c) United States enters the war, April 6, 1917
 - (1) Conscription
 - (2) Army in France
 - (3) Liberty Loans successfully floated
 - (4) Government operation of railroads
 - (5) Armistice, November 11, 1918

- (d) Peace Negotiations
 - (1) President goes to Paris
 - (2) Treaty presented to Senate
 - (3) Controversy over league of nations

III MISCELLANEOUS EVENTS

- (1) Completion of Panama Canal
- (2) Panama-Pacific Exposition
- (3) "War-time" prohibition effective July 1, 1919
- (4) Death of Theodore Roosevelt

Questions on Woodrow Wilson

Who were Woodrow Wilson's grandfathers?

Sketch his career as educator.

Why did he not continue the practice of law?

What was there unusual about his election as governor of New Jersey?

What precedents did Wilson ignore while President?

What amendments were proposed or became effective in his administrations?

In what ways was the Wilson era a period of change?

How long did he remain in Europe?

he published *Division and Reunion*, an account of American history from 1829 to 1889, the same year he brought out *An Old Master and Other Political Essays and Mere Literature and Other Essays*. His *History of the American People*, in five volumes, was published in 1902, and is one of the most readable narratives of its kind. Of more recent date are *The New Freedom*, *Guarantees of Peace and International Ideals*. The eloquent war messages of Woodrow Wilson are familiar to contemporary readers. Undoubtedly some of them will have a place in American literary annals with the utterances of Webster and Lincoln.

Related Articles. Consult the following titles for additional information:
 Banks and Banking Prohibition
 Louisiana Tariff
 Mexico (history) Woman Suffrage
 Nations, League of World War

WILSON, WILLIAM

LYNE (1843-1900), an American statesman and educator, born in Jefferson County, Va. He was graduated from Columbian College, Washington, D. C., studied at the University of Virginia and served in the Confederate army. Later he became professor of Latin at Columbian College and practiced law from 1871 to 1882, when he was chosen president of the University of West Virginia. In 1883 he entered Congress as a Democrat and served twelve years. As chairman of the Ways and Means Committee, he led the opposition to the Sherman silver purchase law and was the author of the famous Wilson Tariff Bill (see *TARIFF*). In 1895 he was made Postmaster-General by President Cleveland, and at the close of his term became president of Washington and Lee University.

WINCHELL, ALEXANDER (1824-1891), one of America's greatest geologists, who produced more than twenty volumes on geological topics and who taught for many years. He was born in Dutchess County, N. Y., and was graduated in Wesleyan University in 1847. Immediately he was appointed to the chair of physics and civil engineering at the University of Michigan, but was soon transferred to the geological department. He was a founder of the Geological Society



WIND, movements of the atmosphere caused by unequal heating and the resultant inequality of pressure on different parts of earth's surface. The temperature is highest and the atmospheric pressure is lightest at the equator, while at the poles the temperature is lowest and the air most dense.

The heating of the air at the equator produces an upward current, which continues until the rising air reaches layers of atmosphere of the same density, when the vertical motion is changed to a horizontal one, and currents set in toward the poles. As the warm air over the equator rises, the cool air on either side moves in to take its place, so that there are in the equatorial regions two sets of currents, blowing towards the equator, and an upper current blowing towards the poles. When the upper current reaches the temperate latitudes it becomes of the same density as the air near the surface and descends, mingling with the surface currents. For this reason there may exist areas where for many consecutive days there is no wind.

Were it not for the rotation of the earth, these currents would blow directly north and south. As it is, each is deflected from its course. The wind blowing toward the equator enters regions having a greater velocity of rotation than those from which it came. It is unable at once to acquire this velocity and, as it were, lags behind, producing easterly winds.

Winds blowing toward the poles are constantly entering regions having a lower velocity of rotation, and their eastward motion is greater than that of the land; hence they become westerly winds. In the northern hemisphere they blow from the southwest, and in the southern hemisphere, from the northwest.

In and near the tropics, these currents are quite regular, but as they approach the temperate latitudes and become nearer equal in temperature and pressure, they are subject to many local influences and become very irregular; hence no theory of wind which accounts for the general circulation of the atmosphere is sufficient to explain the prevailing winds in many localities, and the ac-

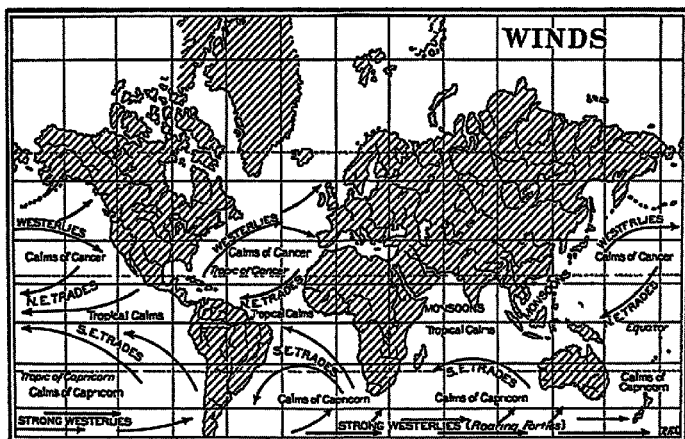


WILLIAM L.
WILSON

ounting for these is one of the most difficult problems with which the meteorologist has to contend

A wind is named from the direction from which it blows, an easterly wind blows from the east, a westerly blows from the west The

cylinder, several inches in diameter, with a square hole at each end, into which bars, called handspikes, can be inserted for turning it As the roller is turned, it winds a rope or chain, which raises the weight The windlass used for raising buckets of water from a well



force of the wind depends upon its velocity, which is determined by the anemometer, an instrument constructed of four hemispherical cups at the ends of horizontal bars, mounted on a vertical axis and attached to a registering system of clock work.

Related Articles Consult the following titles for additional information
 Beauford Wind Scale Simoom
 Calms Regions of Sirocco
 Cyclone Storms
 Khamia Tornado
 Land and Sea Breezes Trade Winds
 Monsoon Typhoon
 Northern Weather Bureau
 Prevailing Westerlies Whirlwind

WINDERMERE, *wind'ur meer*, the largest lake of England, situated in Westmoreland and Lancashire counties, in the northwestern part of the country It is ten and one-half miles long and about a mile wide It contains seven islands, and has steep and rugged shores The beauty of its scenery inspired Southey, Wordsworth and Coleridge

WINDHOVER, *wind' huw ur*. See KESTREL

WIND'GLASS, a mechanical device for raising weights with little power The windlass is a modification of the wheel and axle, and in its simplest form it consists of a mounted

has a winch at one or both ends of the roller. The lifting power of a windlass may be greatly increased by fitting a cog wheel between the cylinder and the winch See DERRICK

WIND'MILL, a mechanical device which utilizes the energy of the wind for pumping water from wells, for grinding grain, cutting fodder for stock, for running churns, and many other purposes where a small amount of power is needed The mill in general use on American farms has a wind wheel with radiating wooden or metal slats, placed close together and inclined, though not overlapping This wheel rotates on a horizontal bar having at its opposite end a vane which keeps the wheel constantly facing the wind The wheel is mounted on a frame twenty-five or more feet in height, to expose it to the wind's action The speed of the mill is regulated by a gearing The amount of power varies with the machine There are mills which, under favorable conditions, furnish as high as four or five horse power This type of mill is a distinct improvement upon the old-fashioned Dutch windmill, which has four radial arms covered with canvas The latter is mounted

on a tower on wheels and is turned by hand when a change in direction of the wind makes it necessary to set the sails to the breeze

WINDPIPE See **TRACHEA**

WINDSOR, HOUSE AND FAMILY OF, the name of the British royal family since July, 1917 When Victoria was crowned as queen in 1837, she was of the House of Hanover, the German line which gave Great Britain the four Georges and William IV It will be remembered that George I knew no English and was not in sympathy with English ideals and traditions, he was more proud of his German title of Elector of Hanover Victoria married into the House of Saxe-Coburg and Gotha when she took the German Prince Albert as her husband The family name of Albert was Wettin, it was an illustrious family, coming into prominence in the tenth century In time by conquest and marriage it controlled several duchies, among them Saxe-Coburg and Gotha

In 1917, in the midst of the World War, the royal house determined to rid itself of this link with German life, though no longer significant, yet a reminder of the then implacable enemy against which the English nation and its allies were contending Therefore, by proclamation on July 17 of that year, the name of the royal family was changed from the House of Saxe-Coburg and Gotha to the House and Family of Windsor, much to the nation's satisfaction The name of George V, until then George Frederick Ernest Albert Wettin, became George Frederick Ernest Albert Windsor, his son, the Prince of Wales (now Edward VIII), became popular "David Windsor"

WINDSOR, *winn'sur*, Ont., in Essex County, on the Detroit River, directly opposite Detroit, and on the Canadian Pacific, the Canadian National, the Michigan Central, the Wabash, and Pere Marquette railroads It is connected with Detroit by ferry, by the new international bridge and by railway and vehicular tunnels under the Detroit River It is one of the principal centers in Canada for the manufacture of automobiles and drugs, and also has large steel mills, machine shops, and a salt refinery that is one of the largest in the Dominion Windsor was first settled in 1812 Population, 1921, 38,591; 1931, 63,108

WINDSOR CASTLE, one of the most magnificent royal palaces in the world, situated at Windsor on the Thames, about

twenty miles from London. Windsor was the residence of the Saxon kings before the Conquest

William the Conqueror first built a royal residence there, and succeeding rulers have added to, torn down and rebuilt it The present structure was completed in the reign of George IV. The castle consists of buildings surrounding two great courts, between which is the round tower, or keep, the oldest part of the structure, built by Edward II Saint George's chapel, an imposing part of the castle is a fine example of Gothic flamboyant architecture It has a vault, in which are buried many members of the royal family, among whom are Henry VI, Edward IV, Henry VIII, Jane Seymour, Charles I, George IV, and George V. Adjoining this is Albert Chapel, one of the most beautiful of memorial buildings, built by Henry VII as a mausoleum Under James II it was used as a Roman Catholic chapel, and after this it was neglected until George III rebuilt it as a royal tomb

It was Queen Victoria who finished it in the most sumptuous manner, as a memorial to her husband, Prince Albert Besides the private rooms of the royal family, there are in the castle richly furnished state apartments See illustration, in the article **ENGLAND**

WINDWARD ISLANDS, a group of islands of the West Indies embracing Saint Lucia, Grenada, Saint Vincent and a chain of smaller islands, all under a British governor-in-chief The islands are so called because of the fact that they are exposed on their eastern sides to the trade winds See **LEEWARD ISLANDS**

WINE, the fermented juice of fruits, particularly of grapes The grape sugar contained in grape juice is readily changed through fermentation into alcohol The process of manufacture is simple To separate the juice the grapes are placed in a crushing machine having two corrugated cylinders which crush the grapes without crushing the seeds The *must*, as the resulting mass of pulp is called, is then forced by pumps through hose to large wooden vats or tanks, where the fermentation takes place, usually slowly.

The fermentation is watched with the greatest care, for upon it depends the quality of the wine It is hastened by raising the temperature or by placing in the must a small

quantity of fermented pulp from another vat. When the fermentation is completed, the juice is strained from the pulp and placed in large reservoirs, called *tuns*, where it remains until the wine is ripe. It is then drawn into casks or bottles and is ready for market.

Wines are known as *dry* when complete fermentation takes place and all the sugar is converted into alcohol. When fermentation is arrested while there is yet some sugar, the result is a sweet or *fruity* wine. A sparkling wine is one which effervesces when the bottles are uncorked. Champagne is a good illustration. In such wines fermentation has been arrested before all the carbonic acid has escaped. In color, wines are known as *red* or *white*. Red wines are produced by allowing the skins of the grapes to remain in the vat during fermentation. The amount of alcohol in wine varies from 16 to 25 parts in 100. In light wines it may be from 7 to 12 parts in 100.

Wines are manufactured in almost endless variety, and many of them are named from the locality in which they are made, such as Port, Burgundy, Bordelais and Rhemish wines. The leading countries in the world in the manufacture of wine are France, Spain and Italy. In the United States wine has been extensively manufactured in California. Excellent wines are also produced in New York, Ohio, Virginia and other states.

Related Articles. Consult the following titles for additional information:
 Champagne Port Wine
 Grape Sherry

WINGED BULL, a type figure of ancient Assyrian sculpture. It was customary to place winged bulls with human heads before the entrances of royal palaces, as it was believed they guarded the buildings from enemies. Some of the larger bulls were seventeen feet high. The wings of the creatures were carved on huge plinths that covered the wall, while the body projected from the wall, the head and breast being outside the arch of the entrance.

WINGED LION, a famous piece of bronze sculpture representing a lion with wings. It is the emblem of Saint Mark, and was cast in 1178 for the embellishment of one of the two large columns at the south end of the extension to Saint Mark's Square, Venice.

WINGED VICTORY, or **NIKE OF SAMOTHRACE**, a famous piece of antique sculpture, dug up in 1862 on the island of

Samothrace, in the Aegean Sea, and now in the Louvre, Paris. Nike, the Greek goddess of victory and winged messenger of Zeus and Athene, is here represented as standing on the prow of a ship, her transparent draperies whipped by the breeze. The statue, it is believed, was made to commemorate some military victory of the Greeks. It is badly mutilated, but what remains of it is treasured for its buoyant vitality, its sinuous grace and the noble dignity of its poise. See **SCULPTURE**.

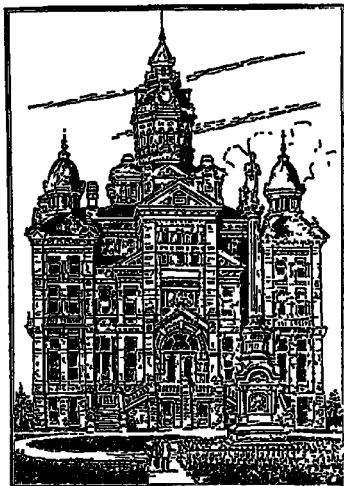
WINKELRIED, *von'kei rest*, ARNOLD, a Swiss patriot, who, if legend be true, brought about the independence of Switzerland. According to the popular story, at the Battle of Sempach, when the Swiss were fighting for liberty against their Austrian oppressors, Winkelried, who was only a poor peasant, conceived the idea of leading his countrymen in close triangular formation. By deliberately sacrificing their lives they drove a wedge into the enemy and thus made a breach which opened the way for a successful attack and victory.

WINNEBA'GO, an important Siouan tribe, now numbering about 2,000, who live in Wisconsin and Northeastern Nebraska. When the Jesuits met the Winnebagoes, they held a broad tract in Central Wisconsin, near Green Bay and Lake Winnebago. They were a tractable people, but many of them died from the ravages of smallpox, and their numbers greatly diminished.

WINNIPEG, LAKE, a lake situated in the south-central part of Manitoba. It has an area of 9,459 square miles, and is a little larger than the state of Vermont. The southern half is in the form of a narrow arm, which extends southward to within about thirty miles of the city of Winnipeg. Its entire length is 260 miles, its greatest width about sixty miles and its greatest depth 100 feet. It receives the Winnipeg, the Red River of the North and the Assiniboine on the south, and the Saskatchewan on the west. Its outlet is by the Nelson River, which, after flowing through several small lakes, reaches Hudson Bay. The fisheries are the most important in Manitoba, yielding \$400,000 annually.

WINNIPEG, MANITOBA, the capital of the province, the county town of Selkirk County and the third largest city of the dominion, is situated at the confluence of the Assiniboine and Red Rivers. It is about 66 miles north

of the United States boundary and practically midway between Montreal and Vancouver. Its geographic position is unique, it lies in a great plain, midway between Lake Winnipeg and the international boundary, and is thus like a spout through which all the trade between eastern and western Canada must flow. It is entered by two great railway systems, the Canadian Pacific Railway, and the Canadian National Railway, and their repair shops are among the largest



WINNIPEG CITY HALL

industries of the city. The Great Northern and Northern Pacific lines give the city direct communication with Minneapolis and Saint Paul and other important commercial centers in the United States.

Winnipeg is a great wholesale center, and its manufactures are increasing in importance. It has over 400 factories, whose total annual output exceeds \$75,000,000. The wholesale trade in normal times averages \$250,000,000 a year. Over sixty buildings of the agricultural college were completed in 1920, there are a number of colleges including the University of Manitoba, Saint John's College, Wesley College, Manitoba College and Manitoba Medical College. The city is well built, with wide, regular streets and many beautiful buildings, among which

are the city hall, the postoffice, the parliament buildings, the courthouse, Carnegie Library, the new Fort Garry Hotel, Eaton's department store, two great railroad stations and the Hudson's Bay Company, McArthur, Sterling Bank and Ideal buildings.

The site of Winnipeg, in a rich river valley, early attracted settlers. The Hudson's Bay Company in 1812 erected Fort Douglas, which protected the colonists sent out by the Earl of Selkirk; these colonists were the first real settlers in Manitoba. Fort Garry, built in 1822 and rebuilt in 1835, was for years the seat of government in the Red River Valley. In 1873 the city of Winnipeg was incorporated. Its growth has been rapid, and it has enjoyed great prosperity.

In 1910 the most serious strike in its history occurred. Practically all of the union men stopped work, and for several weeks the situation was grave. The city government called for citizen volunteers to act as policemen, and they carried on public activities until the strike was broken. In 1870 the city had 215 inhabitants, by 1901 its population was 42,340, by 1931 it had increased fivefold, to 218,785.

WINNIPEGOSIS LAKE, a lake in the southwestern part of the Canadian province of Manitoba, lying west of Lake Winnipeg and northwest of Lake Manitoba. It has an area of 2,086 square miles, and is 122 miles long and twenty miles in width at the widest part. Small boats can safely ply the lake, but numerous shallow places prevent navigation of large vessels. Its waters are stocked with whitefish and pike, and it is much in favor with anglers. The lake discharges into Lake Manitoba through the Waterhen River.

WINONA, MINN., the county seat of Winona County, 103 miles southeast of Saint Paul, on the Mississippi River and on the Chicago, Burlington & Quincy, the Chicago & Northwestern, the Chicago Great Western, the Chicago, Milwaukee, Saint Paul & Pacific, and the Green Bay & Western. There is a combined government and private airport. It conducts a large trade in grain, lumber and live stock. Its industries include sawmills, railroad shops, flour mills, packing plants, and manufactories of patent medicine, flax fiber, farm implements, shoes and candy.

A state normal school is located here, and the city has a seminary for young women, a business college and a public library. From

ment structures include a Federal building, a courthouse, a city hospital, Watkins administration building and the Margaret Simpson Home. Winona is partially surrounded by bluffs of peculiar rock formation, Sugar Loaf and Trempealeau Mountains being especially picturesque. The place was settled in 1851, and the city was chartered in 1857. Population in 1920, 19,143, in 1930, 20,850, a gain of 9 per cent.

WINSLOW, JOHN AXORUM (1811-1873), an American naval officer, commander of the *Kearsarge* in the battle between that vessel and the Confederate cruiser, *Alabama*, in 1864. The *Alabama* was sunk, and Captain Winslow, who had already won distinction in battle, was promoted to the rank of commodore. After the Civil War he commanded the Gulf squadron and later the Pacific squadron. He was made rear-admiral in 1870.

WINSTON-SALEM, N C, the county seat of Forsyth County, 110 miles west of Raleigh, on the Norfolk & Western, the Southern, and the Winston-Salem South-bound railroads. There is an airport. Winston and Salem were consolidated to form the present city in 1913. Winston-Salem has the largest factory output of tobacco products of any city in America, amounting to 80,000,000 pounds per year and valued at \$45,000,000, or more than \$1,300 per capita for the entire population. Other industries include the manufacture of textiles, hosiery and underwear, furniture, and air conditioning machinery. Educational institutions include the Salem Female Academy and the Winston-Salem Teachers' College (colored). A Federal building, a Carnegie Library and the Salem Museum are among the principal buildings. Salem was founded in 1766 by the Moravians, and was governed for a time as a Church community. Population, 1920, 43,395, in 1930, 75,274.

WINTER, the season of the year between autumn and spring, beginning with the winter solstice, about December 22, and ending with the vernal equinox, about March 21. In the United States, the months December, January and February are commonly regarded as the winter months, although winter does not begin until December 21 or 22.

WINTERGREEN, a small plant, several inches high, which grows in the woods of the northern hemisphere. Glossy, oval leaves, green all winter, grow on the ends of reddish stems. Small white or pink flowers spring

from the base of the leaf stems and scarlet berries follow them. The leaves yield an oil which is much used for flavoring and for medicinal purposes.

WINTERBOP, JOHN (1588-1649), one of the early colonial governors in America, and one of the most admirable characters in early American history. He was born at Edwinston, Suffolk, England, of wealthy parents, and was educated at Trinity College, Cambridge. Puritan zeal prompted him to share the fortunes of the colonists, and in 1629 he sailed to America with 900 emigrants as governor of Massachusetts Bay colony. From then until the time of his death he worked for the spiritual and material interests of his people.

Winthrop helped to organize the New England Confederation, and was its first president. His *Journal* is a valuable record of New England events from 1630 to 1649.

WIRE, metal drawn into an even thread or slender rod, usually cylindrical in form. The metals most commonly employed in the making of wire are gold, silver, copper and iron. The finest wire is made from platinum. Wire was formerly produced by hammering metal into plates which were then cut into strips and rounded by beating. In modern wire manufacture, steel or iron billets are heated in a furnace to white heat and put through several trains of rolls, emerging from the last roll about a quarter of an inch in diameter. These rods are wound on reels while still hot, are cooled, boiled in sulphuric acid for cleaning, washed in water, coated in lime, baked for two hours at low temperature, and then turned over to the wire drawer.

In order to draw these prepared rods into wires of smaller diameter, the workman pulls them through a series of steel dies by means of a cast-iron reel. Very fine wires may be drawn as many as twenty times, each time through smaller holes. As the process of drawing causes brittleness in wire, it must be annealed as occasion demands by heating in cast-iron pots, this process always being followed by an acid bath for cleaning. Wire used for small springs or nails, when hardness is an essential, is not annealed. For drawing very fine wires of gold, silver or platinum, dies of diamonds, rubies or other hard stones are used. Wire for outdoor use is galvanized to prevent rusting.

The uses of wire are unnumberable, from the forming of the gigantic steel cable, with

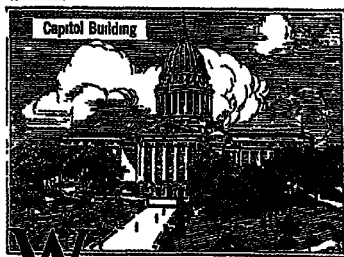
a tensile strength of 130 tons to the square inch, to the delicate micrometer of the telescope, employing platinum wires as fine as $\frac{1}{16}$ of an inch in diameter. Telephone and telegraph wires, trolley wires, wire netting and wire fencing are some of the most common uses. A sinister use during the war was that made of barbed wire enmeshed into an impenetrable network to hinder enemy advance. The United States army alone used 100,000 miles of barbed wire in its campaigns in France. American factories sold over 2,000,000 miles of this wire to the allied nations from 1915 to the date of the armistice in November, 1918.

WIRE GLASS, window glass made with an inside mat of open mesh wire. The wire is embedded in the molten glass at a temperature sufficiently high to insure adhesion of the glass to it. The surface of the pane can be finished in such style as to adapt the glass for different uses. It may be ribbed, polished or "rough rolled." Wire glass is strong, and is used for window panes where ordinary glass is apt to be broken. It is one of the most efficient safeguards against fire, since, if broken by heat, it does not fall. Two men claim the invention of wire glass, Frank Schuman of Philadelphia and Leon Appert of France.

WIRELESS TELEGRAPH. See TELEGRAPH, WIRELESS.

WIRELESS TELEPHONE. See TELEPHONE, WIRELESS.

WIREWORMS, *wire worms*, a name given by farmers to the larvae, or grubs, of several species of click beetles. The worms are said to live for years, during all which time they are destructive to vegetation. See **CLICK BEETLE**.



WISCONSIN, a north-central state of the American Union, one of the foremost American commonwealths in educational and

political matters, and industrially one of the most prosperous. Wisconsin is popularly called the *Badger State*, referring to the habits of the lead miners in early days, who lived in rude dugouts, after the fashion of the badger. The name *Wisconsin* is of Indian origin, and has been variously interpreted to mean *rising river* and *great rocks*. The flower emblem of the state is the violet.

Location, Area, Population. Wisconsin lies north of Illinois and east of Minnesota and Iowa; nearly all of the western boundary is formed by the Saint Croix and the Mississippi rivers. A good portion of the eastern boundary line lies in Lake Michigan, the state adjoins the state of Michigan on the northeast, and at the extreme north it follows the shore line of Lake Superior. With a maximum length of 320 miles and a width of 295 miles, the state is irregularly oblong in shape and has an area of 56,066 square miles; of this total 810 square miles are water. Twenty-four states surpass it in area, and 12 in population, which in 1930 was 2,939,006, with an average density of 53.2 persons per square mile. Wisconsin has about four times as many inhabitants as Rhode Island, the most densely populated of our states, but it is almost 50 times as large as that smallest of commonwealths.

Peoples and Cities. The founders of the state came largely from New England and New York State. The foreign-born at one time made up a third of the population, but their ratio to the total number has declined. Germans constitute one-third of the foreign-born; next in order are Poles, Norwegians, Czechoslovakians, Swedes, Russians, Canadians and Englishmen. About 53 per cent of the people live in cities and towns of 2,500 or more inhabitants. There are 27 cities with populations exceeding 10,000. Milwaukee, the largest city, with a population of 578,240, is the twelfth city in the Union in size. The next six cities of the state are as follows: Racine, Madison, the state capital, Kenosha, Oshkosh, La Crosse, and Sheboygan.

About 45 per cent of the inhabitants are Roman Catholics, and over one-fourth are Lutherans.

Surface and Drainage. The surface of Wisconsin is generally a great rolling plain. A low height of land extends through the state north and south, a little east of the middle line, and at a point about 30 miles south of Lake Superior it meets another ele-

vation extending east and west. The highest altitudes of this ridge are about 1,800 feet. These ridges form watersheds from which the land slopes in all directions. There are no high mountains in the state, but the rivers flow through well-worn valleys in some localities, and along the Mississippi and other streams there are bluffs. There is also a very conspicuous bluff along Green Bay. The lowest part of the state borders on Lake Michigan, which is slightly less than 600 feet above sea level.

Wisconsin is divided into three drainage areas. The northwestern part of the state is drained into Lake Superior by a few short rivers, chief of which are the Montreal and the Bois Brule. The area east of the watershed extending north and south is drained into Lake Michigan, and with the exception of the Fox, all of the rivers in this region are short. Some of the most important are the Menominee, forming a large part of the boundary between Wisconsin and the northern peninsula of Michigan, the Peshtigo and the Oconto.

Nearly three-fourths of the state is drained into the Mississippi River. The chief tributaries are the Saint Croix, forming a part of the western boundary, the Chippewa, the Black, and the Wisconsin, which flows through the central part of the state and is the largest river wholly within its boundaries. Each of these rivers has numerous tributaries, but none of them is navigable for large boats. Through a part of its course the Wisconsin has cut its way through sandstone bluffs, forming the Dells (or Dalles, which see), noted for their beautiful scenery. In the southeastern, north-central and northern parts of the state are numerous lakes which are the favorite resorts for summer residents and also for hunters and fishermen. The largest of these is Lake Winnebago, almost directly south of Green Bay. Lakes Geneva and Mendota are noted for their beautiful landscapes setting. The former is a popular summer resort; on the latter is the city of Madison, seat of the state university.

Climate. The winters are long and severe, but of uniform temperature, with many dry, clear days, the summers are short and hot. But the cold of winter and the heat of summer in the eastern section are tempered by the waters of Lake Michigan. In northern Wisconsin, snow usually falls early in the winter and covers the ground until late in the

spring, in the south there is often little snow. The average rainfall is 30 inches.

Mineral Resources. Though the state derives much greater income from agriculture than from mining operations, it has valuable deposits of zinc, building stone, iron ore and clays. The total annual mineral output is valued at about \$18,000,000. The most important building stones are granite, limestone and sandstone, with an annual value of over \$5,000,000. Iron, zinc and lead are important products. Iron ore is found in the valley of the Menominee River and along the Penokee range in the northern part of the state. The deposits are a continuation of those in Michigan and Minnesota, and the ores are similar in quality. In quantity of output, however, Wisconsin is far behind Michigan and Minnesota. The products of each year often are valued at about \$3,000,000. Clay suitable for making brick and tiling is widely distributed, and the manufacture of cream-colored brick is one of the most important industries of the state. Other products of value include natural cement, graphite and mineral waters.

Agriculture. Originally a large part of the state was covered with forests, in the north the principal timber was pine. Regions between the forests consist of marsh or land covered with boulders. Hence this part of the state is not suited to general agriculture, but it is well adapted to dairying, this industry has been extensively developed. The middle and southern portions of the state consist of fertile prairie lands. They are supplied with an abundance of moisture, and the temperature is suitable for growing all crops produced in a medium or cool temperate climate.

Oats and corn are the most important grain crops, the annual harvest of oats at times exceeds 100,000,000 bushels. About 4,000,000 tons of hay are produced each year. Barley and rye are raised in large quantities, buckwheat is another important product. In the central region of the southern group of counties is a fertile tobacco belt by means of which Wisconsin holds seventh place among the states in the amount of tobacco raised. Sugar beets, potatoes, beans, peas, apples and small fruits are other flourishing products. The state is one of the few regions in America producing cranberries on a commercial scale, it is one of the first five states in the production of peas and beans.

Dairying is one of the most profitable lines of agriculture, and Wisconsin produces more cheese than any other state. Minnesota alone exceeds it in the output of creamery butter. Cows and heifers number more than 2,000,000, to them must be added 1,000,000 other cattle.

Manufactures Wisconsin ranks tenth among the states in manufactures. In 1880, when wheat was still a leading crop, flour and grist-mill products were first among her manufactures. Subsequently lumber and timber stood at the head of the list, still later butter, cheese and condensed milk stood first.

There is a great diversity of manufactures, among these motor vehicles stand first with a yearly value of about \$219,000,000, while motor vehicle bodies and parts and rubber tires and tubes are worth an additional \$136,000,000. Butter, cheese and condensed milk are worth \$203,000,000. Other industries are foundry and machine shop products, paper and wood pulp, engines, turbines, wholesale meat packing, boots and shoes, knit goods, electrical machinery and aluminum. Milwaukee holds a leading position in brewing.

Transportation and Commerce The western part of the state has an outlet through the Saint Croix and the Mississippi rivers, the northwestern section sends freight through Lake Superior, while the eastern portion, bordering in its entire length upon Lake Michigan, has communication with the Great Lakes through Racine, Milwaukee, Sheboygan, Manitowish, Sturgeon Bay and other points.

Wisconsin maintains about 7,300 miles of steam railways. The leading railroads are the Chicago, Milwaukee, Saint Paul & Pacific, the Chicago & North Western, and the Minneapolis, Saint Paul & Saint Ste Marie, commonly called the "Soo." This line became a subsidiary of the Canadian Pacific and many years ago absorbed the old Wisconsin Central and thus gained connection with Chicago. The Green Bay & Western is the longest line extending wholly within the state. Several railroads developed to a great extent in other states have only a small mileage in Wisconsin; such are the Chicago, Burlington & Quincy, the Illinois Central and the Northern Pacific. Four strong bus companies have absorbed much of the traffic formerly carried by the interurban electric lines. Three interstate air lines serve Wisconsin.

The commerce of the state is extensive. Iron, dairy products, live stock, lumber and its manufactured products, flour and grist-mill products, potatoes and other vegetables are exported in large quantities. The imports consist of manufactured goods and machinery.

Government. The legislature consists of a senate and a house of representatives, the senate having thirty-three members, and the house, 100. The members of the assembly are elected for two years; of the senate, for four years. The sessions are biennial and are unlimited as to time. The executive department consists of a governor, a lieutenant-governor, a secretary of state, a treasurer and an attorney-general, each elected for two years, and the superintendent of public instruction, chosen at a spring election for a four-year term. In the judicial system there are the supreme court of seven judges elected for ten years, and the circuit courts in the several judicial circuits established by the legislature, each circuit having one judge elected by the people.

Much of the work of government in Wisconsin is done by departments either established or put into present form within the twentieth century. Each of these greater departments is headed by a group of three persons, usually called commissioners. They are appointed by the governor, subject to confirmation by the senate, for six years, terms are arranged to overlap so that commissions may never lack experienced members.

The list of these commissions is as follows: public service, highway, industrial, commissions; board of control for state institutions; tax and banking commissions; and the department of agriculture.

Education Wisconsin has a system of public education extending from the kindergarten through the graduate and professional schools of the state university. The elementary and secondary schools care for more than 800,000 pupils and cost about \$22,000,000 annually, and the total yearly expenditure of the state and its subdivisions for all types of education is about \$70,000,000. The University of Wisconsin at Madison is at the head of the system, and is directly affiliated with the high schools throughout the state. There are nine institutions which began work as normal schools, but they are now called state teachers' colleges, and grant bachelors'

degrees to graduates of their four-year courses. They are located at Milwaukee, Oshkosh, Platteville, River Falls, Stevens Point, Superior, Whitewater, La Crosse and Eau Claire, their aggregate enrollment is not far from 7,000. The state also supports Stout Institute at Menomonie in Dunn County, a nationally known training school for teachers of home economics, manual training and other vocational subjects. Wisconsin has a unique system of county training schools to prepare teachers for the rural schools. It has also been a great leader in vocational education. In connection with its educational department, Wisconsin maintains an excellent system of school libraries, which are so managed as to bring a large list of the best books within reach of every inhabitant of the state, at practically no expense. The traveling libraries have no connection with the educational department, being promoted by the state library commission. The library of the historical society at Madison is also one of great value. Another agency for extending popular education is the excellent extension system of the state university (see WISCONSIN, UNIVERSITY OF).

Important institutions of higher learning not under the control of the state include Beloit College at Beloit, Lawrence College at Appleton, Ripon College at Ripon, Milton College at Milton, Carroll College at Waukesha and Milwaukee-Downer College at Milwaukee. Of somewhat later foundation are Marquette University and Mount Mary College (for women), both of them Roman Catholic institutions located in Milwaukee.

Other Institutions. The school for the blind is at Janesville, the institution for the deaf and dumb is at Delevan, there are schools for the feeble-minded and epileptic at Chippewa Falls and at Union Grove in Racine County, the state public school for dependent children is situated at Sparta. There are hospitals for the insane at Mendota and Winnebago and a hospital for the criminal insane at Waupun, the memorable insane are cared for in county institutions which receive state aid. A state tuberculosis sanatorium was established at Wales in 1905 and later it was supplemented by a camp for male convalescents at Lake Tomahawk in Oneida County. There are also nearly twenty state-aided county tuberculosis sanatoria.

There is a state soldiers' home at Waupaca

Items of Interest on Wisconsin

Wisconsin was the last complete state made out of the Northwest Territory. There still remained as much of Minnesota as lay east of the Mississippi River, so that altogether the Northwest Territory became five and a half states.

Wisconsin's climate is marked by much sunshine and high temperature in summer and by clear sky with low temperature in winter, the climate is tempered to a limited degree by the large bodies of water east and north.

Many of the wild animals have been killed off, but deer are still plentiful in the northern part of the state, and wolves, black bears and foxes are occasionally seen, waterfowl of all kinds are abundant and fishing is both a great sport and an important business.

In Grant County there is a huge mound shaped like an elephant, with a trunk thirty-two feet long. This is a relic of the Mound Builders of prehistoric times.

Wisconsin's many lakes, waterfalls and rapids are the result of glacial action.

School attendance is compulsory for all children between the ages of 8 and 14, in cities for the entire school year, and in towns and villages for six months. Public schools are open to pupils aged 5 to 21.

The highest point in the state, Rib Hill, is in Marathon County. It has an altitude of 1,940 feet.

Questions on Wisconsin

Describe briefly the surface and drainage of Wisconsin.

Name five important agricultural products and four minerals.

What can you say about the importance of dairying in Wisconsin?

What is the most important manufacturing industry?

Name five other manufacturing industries.

Name five important agricultural institutions.

Explain, as fully as you can, Milwaukee's importance in commerce and manufactures.

and a national soldiers' home at Milwaukee. The penal and reformatory institutions consist of a state prison at Waupun, a state reformatory near Green Bay, an industrial school for boys at Waukesha, a house of correction and industrial school for girls at Milwaukee, and an industrial home for women in Fond du Lac County.

History. Probably the first white man to enter the territory of Wisconsin was Jean Nicolet, who was dispatched in 1631 by Champlain and who reached the shores of Green Bay. Other traders and missionaries followed, including Radisson and Groseilliers, Father Allouez and Marquette and Joliet. Meantime, several missions had been established, one at La Pointe on Lake Superior in 1665 and one at the site of De Pere in 1669. By the Treaty of Paris, in 1763, the territory, with all the northwest was transferred to Great Britain and, after the Revolution, to the United States, where it formed a part of the Northwest Territory. However, the French and Indians in the region still remained hostile to the United States and fought against it during the War of 1812. The discovery of lead mines eventually brought on a rapid influx into the territory, and after the defeat of Black Hawk there was a large agricultural immigration.

Wisconsin was successfully joined to Indiana and Michigan, it was erected into a separate territory in 1836. In 1847, the population of the state having been vastly increased, a constitution was adopted, and Wisconsin was admitted to the Union in the following year. For a time the chief incident in the political history of the state was the scandal arising from the promiscuous granting and sale of public lands to railroads. One of the first movements leading to the organization of the Republican party was a convention at Ripon, Wis., in 1854. The state was consistently opposed to slavery, and its supreme court declared that the Fugitive Slave Law was unconstitutional in the state. During the Civil War, Wisconsin furnished more than her quota of troops. Since that period the state has been almost consistently Republican in politics. However, after 1901, when the elder La Follette became governor, the Republican party was divided into two factions, the Progressive and the Stalwarts; they have alternated in the political control of the state.

Since 1900, Wisconsin has passed many

progressive laws, including workmen's compensation, mothers' pension and child labor measures and a law regulating campaign contributions. In 1913 there was enacted a law requiring a physical examination for all men who applied for marriage licenses. This was subsequently upheld by the state supreme court. Wisconsin was the first state to enact a plan for unemployment insurance.

Related Articles. Consult the following titles for additional information:

CITIES

Appleton	Janeville	Oshkosh
Ashland	Kenosha	Racine
Beloit	La Crosse	Sheboygan
Chippewa Falls	Madison	Stevens Point
Eau Claire	Manitowish	Superior
Fond du Lac	Marinette	Waukesha
Green Bay	Milwaukee	Wausau

PHYSICAL FEATURES

Dalles	Mississippi River
Great Lakes	Wisconsin River

HISTORY

Black Hawk	Ordinance of 1787
Northwest Territory	

WISCONSIN, UNIVERSITY OF, one of the largest and most progressive of the American state universities, instruction began at Madison in 1819.

The university stands at the head of the educational system of the state and gives free tuition to students, who are residents in Wisconsin, in all departments except in the library school and the Wisconsin High School. Through an admirably equipped and organized extension department thousands of persons unable to attend regular university sessions are given exceptional advantages. The university maintains three colleges—letters and science, engineering, agriculture, six schools—law, medicine, nursing, education, library, graduate, two divisions—physical education and university extension.

The library building is one of the finest in the United States, it contains over 453,000 volumes. Adjacent is the library of the Wisconsin State Historical Society with 371,000 volumes and the library of the Academy of Sciences, Arts and Letters with 6,000 volumes.

During the regular session there are about 8,000 students in residence, the faculty numbers nearly 1,300. The report of the American Council of Education prepared by 2,000 educational experts placed the university second in the nation as qualified to give graduate instruction, that is, in 31 out of the specified 35 important fields of knowledge.

WISCONSIN RIVER, the principal river of the state whose name it bears. It rises near the boundary between Michigan and

WISCONSIN

THE BADGER STATE



GRAPES



BARLEY



RYE



GRAPES



CONDENSED MILK CO.



IRON ORE MINING



LUMBERING



BUILDING STONE



HAY



POTATOES



APPLES



SUGAR BEETS



CABBAGES



BUTTER



CHEESE



DAIRY COWS



ONIONS



CANNED PEAS



SHRUBS



PAPER MILLS



FISH



TOBACCO FIELD



FLOURING MILL



IRON ORE MINING

Wisconsin, flows southward to Portage City, thence in a southwest direction, entering the Mississippi River four miles south of Prairie du Chien. Its length is about 600 miles, and it is navigable for steamboats to Portage City, about 200 miles. Here a canal connects it with the Fox River. Its passage through some deep gorges forms the celebrated Dalles, near Kilbourn City.

WISTARIA, a climbing shrub of the pea family, native to China and North America. Several varieties have been introduced into England. When in flower they are among the most ornamental of garden plants. The flowers, shaped like pea-blossoms, are of various tints and shades of lavender, and hang in clusters which sometimes are several feet long. The Chinese and American species are much used in the United States for garden ornament.

WISTER, OWEN (1860-), an American novelist and story-writer, born in Philadelphia and educated at Harvard. He was admitted to the bar, but after two years gave up law work for literature and won wide notice through his stories of Western life. Of these *The Virginian* has been most popular. Wister has written biographies of Grant, Oliver Wendell Holmes, Franklin, and Theodore Roosevelt. Among his later books are *Lady Baltimore*, *The Simple Spelling Bee*, *The Seven Ages of Washington*, *Members of the Family*, *The Pentecost of Calamity*, *The Ancient Grudge*, *Neighbors Henceforth*, and *Watch Your Throat*.

WITCHCRAFT. At all times in the world's history there has existed a belief that some persons, in league with powers of darkness, had powers to cast "spells" or inflict injury at a distance by supernatural means. This belief became general in the fifteenth, sixteenth and seventeenth centuries, and in England and America the use of the supposed power to harm through cooperation of a demon was called *witchcraft*, meaning *craft or practice of a witch*.

Women were most often accused of witchcraft, though men and even children were suspected. Laws were passed to deal with them and persecutions were numerous. It is estimated that in England, Germany, France, Spain and Italy 100,000 innocent persons perished under the charge of witchcraft between the middle of the fifteenth and the middle of the sixteenth century. Various tests were applied to ascertain whether or

not the person was a witch, such as pricking the body of the victim all over, to find the insensative spots protected by the devil, and throwing witches into deep water, under the presumption that they would float if possessed.

The witchcraft frenzy broke out among the Puritans of New England in 1648. In Salem, Mass., Cotton Mather, a clergyman of wide influence and great power as a pulpit orator, wrote a work entitled *Memorable Providences Relating to Witchcraft and Possessions* and another entitled *Wonders of the Invisible World*. By the distribution of his writings and his utterances in the pulpit, he succeeded in arousing the superstition to the highest pitch, at a time when it was beginning to abate in Europe.

Many of the teaching men of the province were influenced by his writings and sermons, and, as clergymen in those days constituted a part of the magisterial authority, he succeeded in procuring the execution of nineteen persons. The good sense of the Puritans at last revolted against these atrocities, and a reaction set in. Samuel Parris, a clergyman, who was one of the chief persecutors, made a confession; others also relented, and there were no more persecutions for witchcraft in the American colonies. In England the last trial for witchcraft was in 1722, and it resulted in acquittal.

WITCH HAZEL, a North American shrub which is of economic importance as the source of a healing lotion obtained by distilling the leaves in alcohol. The plant has branches of a very peculiar appearance, for they twist and curve in all directions. In olden times the witch hazel was believed to have supernatural power, and the forked twigs were used as divining rods. The plant does not bloom until late in the fall, and the fruits ripen the following year. The yellow flowers grow in showy clusters. A small, woody capsule encloses the seeds.

WITENAGEMOT, *wit e nah ge mote'*, in English history, the name given to the old Anglo-Saxon assembly, which consisted of the king, the ealdormen, the higher ecclesiastics and the thanes. This body had power to elect the king, when a succession was in dispute, or to depose a king if it saw fit, to make treaties, to collect revenue and to enact laws. Under a weak king it was able to exercise all of these functions, but a strong king might easily make most of them merely

nominal The Norman Conquest put an end to this assembly, and the Parliament which grew up later in England was a separate institution, though it had its roots in this early body

WITNESS, in law, (1) one who signs his name as affirmation of the genuineness of another's signature, (2) a person who gives testimony under oath in a judicial proceeding Any person can be summoned before a court to give evidence If he fails to appear he is liable to punishment for contempt (see *CONTEMPT*) The summons by which he is ordered to appear is called a *subpoena*, if he is ordered to bring a document or other thing in his possession, he is summoned by a *subpoena duces tecum*, meaning *bring with you under penalty*

WITTE, *vit's*, SERGEI YULIEVITCH (1840-1915), a Russian statesman and diplomat, born at Tiflis After his graduation from the New Russian University at Odessa, he took up journalism; later he was engaged by the government in railway service In the Russo-Turkish War Witte had charge of the transportation of troops on the Odessa railway and so distinguished himself that at the close of the war he was made manager of the Southwestern Railway of Russia Two years later he became chief of the Imperial Railway department and president of the tariff commission His next promotion was to the office of Minister of Finance, in 1893 His policy in this office led to the rapid development of manufacturing industries in Russia He introduced the gold standard, made the sale of alcohol a government monopoly, concluded several important commercial treaties, especially with Germany, and made large foreign loans, whereby the Trans-Siberian Railway could be built In 1903 a strong opposition arose and Witte was removed from power and made president of the Committee of Ministers At the Treaty of Portsmouth, N H., at the close of the Russo-Japanese War, Witte was especially prominent When he returned to Russia, the czar conferred upon him the title of count In 1905 he was appointed Prime Minister of Russia, but in 1906 he resigned this position

WITTENBERG, *vit' ten berK*, GERMANY, a town in the province of Saxony, Prussia, situated on the Elbe, fifty-nine miles southwest of Berlin, of special historical interest because of its association with Luther and Melancthon It was to the door of the

Schlosskirche at Wittenberg that Luther nailed his celebrated theses, and within this church both Luther and Melancthon are buried. (See *LUTHER*, *MARTIN*, *REFORMATION*) The town contains a number of educational institutions, in one of which, the University of Wittenberg, Luther for a time was instructor The industries include the manufacture of woolen and linen goods, hosiery, machinery, pottery, etc Population, about 20,000

WOAD, *wode*, a group of plants of the mustard family, chiefly natives of the Mediterranean region *Dyer's woad*, a species yielding a blue dye, was formerly much cultivated This has been superseded by indigo, but a fine blue is still obtained by mixing the two The leaves when gathered are reduced to a paste, fermented for two weeks, made into balls, sun-dried, and subjected to further fermentation

WODEN, *vo'den* See *ODIN*.

WOLF, a carnivorous animal, allied to the dog The common European wolf, found almost everywhere in North America, also, is yellowish-gray, with a blackish band, or



WOLF

streak, on the fore legs The ears are erect and pointed The hair is harsh and strong, the tail straight, bushy and drooping The height at the shoulder is about two and a half feet The wolf is swift of foot and crafty, an enemy to animal life It usually runs in packs to hunt the larger quadrupeds, such as deer and elk When hard pressed with hunger, these packs have been known to attack isolated travelers and even to enter villages and carry off children In general,

however, wolves are cowardly and stealthy. They are still plentiful in many parts of Europe and North America. They probably ceased to exist in England about the end of the fifteenth century. The small *prairie wolf* or *coyote*, a member of the wolf family, living on the western plains of the United States, is a burrowing animal.

WOLFE, JAMES (1727-1759), a British general, whose victory in the Battle of Quebec, September 13, 1759, won Canada for Great Britain. Wolfe was born at Westerham, Kent, England. He entered the army early and served in Scotland and in Flanders. When it was decided, in 1758, to send an expedition to Cape Breton, Wolfe was appointed by Pitt brigadier-general. He advised an attack on Quebec and was selected to lead the enterprise, in which capacity he showed wonderful courage and genius. After having been driven back from the fortress, he led his men, by night, up a steep, narrow path, to the Heights of Abraham, above the city, and here he met the French under Montcalm. While leading a charge, he had one of his wrists shattered by a shot, but he did not stop. Another shot struck him, and he still advanced, but a third lodged in his breast and proved fatal. His last words, when he was told that the French were retreating, were, "Now God be praised, I die in peace." A monument on the battlefield bears a simple inscription in honor of the conqueror. Since 1773 another monument has graced Westminster Abbey in London, and one is in Governor's Garden, Quebec.

WOLF FISH, a savage fish, that has a mouth armed with sharp, strong teeth. When captured, the fish is said to bite the nets and even to attack the fishermen. Around the coasts of Great Britain it attains a length of six or seven feet, but in more southern seas it grows to a still larger size. In Iceland the natives eat the flesh and make the tough skin into a sort of leather suitable for purses, bookcovers and the like.

WOLSELEY, wool's-ly, **GARNET JOSEPH**, Sir, Viscount (1833-1913), a British general, born in Ireland. He entered the army as ensign in 1852, took part in the second Burmese War, where he was severely wounded, and served with distinction in the Crimean War. He engaged in the siege and capture of Lucknow during the Sepoy Rebellion, and was in command in 1860 in the Chinese War. In the following year he was dispatched to Canada, and in 1870 he carried the Red

River expedition to a successful issue. Three years afterward he was appointed to the command of an expedition to punish the king of Ashanti, and after a brief campaign he entered Kumassi and subdued the king. He was publicly honored and given a grant by the government of \$125,000.

He was placed in command in Egypt, in 1882, where his forces successfully stormed the lines of Tel-el-Kebir and captured Arabi Pasha. For this he received the thanks of Parliament, was created a baron and was promoted to the rank of general. In 1882 he was sent to Egypt to rescue General Gordon at Khartum, but arrived two days after Gordon had been killed and Khartum had fallen. On his return to England he was created a viscount. In 1890 he was made commander of the troops in Ireland, and in 1895 he was raised to the supreme command of the British army.

WOLSEY, wool's-y, **THOMAS**, Cardinal (1475?-1530), an English statesman, for many years the most powerful man in England, below the king. He was born at Ipswich, the son of a butcher, and was educated at Magdalen College, Oxford, where he took his degree as a scholar of distinction. When Henry VIII became king, the advancement of Wolsey was rapid. Successively he was appointed canon of Windsor, dean of York, bishop of Lincoln, archbishop of York, lord chancellor of the kingdom, cardinal and Pope's legate.

His power and his revenues were equalled only by those of the Crown. Part of his immense revenues he expended in display, and part for the advancement of learning. He endowed the College of Christ's Church, Oxford, founded several lectures and built the palace at Hampton Court, which he presented to the king. His preferment by the king was largely the result of a remarkable series of diplomatic victories, in which Wolsey had been the means of enabling Henry to hold the balance between Francis I and Emperor Charles V.

In his ambitious career the cardinal had made many enemies, who were held in check so long as he retained the favor of his royal master. This favor Wolsey lost when he failed to obtain from Pope Clement a decision granting the king's divorce from Catharine of Aragon. The enemies of the fallen prelate now succeeded in banishing him from court and stripping him of his dignities.

Finally, after a brief respite, during which he was restored to some of his offices and had returned to his see of York, he was arrested on a charge of high treason. On his way to London, as a prisoner, he died at Leicester Abbey.

WOLVERINE, *wool vur een'*. See GLUTTON.

WOMAN'S CHRISTIAN TEMPERANCE UNION, THE NATIONAL, a woman's organization, founded in Cleveland, Ohio, in 1874, for the purpose of unifying the work of women in temperance and social reform. It now has state, district, county and local societies in every state and territory, and it contains a membership of over 300,000. It is the largest organization exclusively of women that has ever been effected and has over forty distinct lines of work, each under the management of national, state, district, county and local superintendents. The society has been instrumental in securing in nearly every state the enactment of laws requiring the public schools to give instruction in the effects of stimulants and narcotics on the human system, through their influence many laws for the better protection of girls and women have also been passed, and industrial homes for girls and houses of refuge for fallen women have been established. The official organ is the *Union Signal*, published at Chicago. Headquarters of the society are at Evanston, Ill., in "Rest Cottage," the former home of Miss Frances E. Willard.

The World's Christian Temperance Union was formed in 1883, through the influence of Miss Willard. It now has local organizations in most Christian countries. The badge of members everywhere is the white ribbon.

WOMAN'S RELIEF CORPS, a patriotic organization founded in Denver, Colo., in 1883, by a group of women desirous of acting in cooperation with the G. A. R. The specific objects of this society may be stated as follows:

To aid and assist the G. A. R. and perpetuate the memory of their heroic dead, to find homes for the Union Veterans, their widows and orphans, and to emulate the deeds of our army nurses, to maintain true allegiance to the United States of America, to inculcate lessons of patriotism and love of country among our children and in the communities in which we live, to encourage the spread of universal liberty and equal rights to all.

Though few members of the G. A. R. - vive, the Relief Corps maintains its organization in most Northern states.

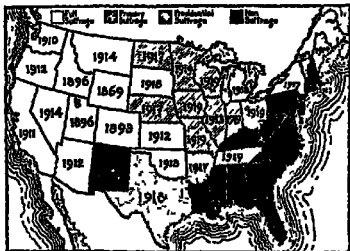
WOMAN SUFFRAGE, the right of women to vote on an equality with men. The agitation to give women a political status equal to that of men is merely one phase of the great movement to recognize woman in every possible way—legally, socially, intellectually, morally, politically—the equal of man. In the field of business this agitation for a fair and equal opportunity for women had made more progress than in any other field, up to 1920, when they were made voters. In nearly all departments of skilled labor, in clerical positions, in the professions, women are efficient and successful workers.

The movement to secure woman suffrage is distinctly a product of the nineteenth century, although many authors and statesmen since Plato have discussed the position of woman and have urged equal rights. One of the first American suffragettes was Abigail Adams, the wife of John Adams, she wanted the Constitution to recognize women as voters.

In nearly all civilized countries women either have won or are still fighting for suffrage, and in most of the countries liberated from autocracy during or at the close of the World War the women were immediately given political rights when new governments were set up. Thus, women vote in Czechoslovakia, Finland, Germany, Austria, Hungary, Poland and Russia. In all the divisions of the United Kingdom women voted for Parliamentary candidates for the first time in December, 1918. New Zealand, Australia and South Africa are equal-suffrage nations, and in Canada women enjoy provincial suffrage in all the provinces except Quebec. Tasmania, Denmark, Holland, Iceland, Norway and Sweden have also enfranchised their women citizens.

In the United States. In the United States the movement for woman suffrage really dates from 1848, when the first woman suffrage convention was held, in Seneca Falls, N. Y. Among its leaders were Elizabeth Cady Stanton and Lucretia Mott. In 1860, through the efforts of Mrs. Stanton and Susan B. Anthony, the National Woman's Suffrage Association was formed. In 1890 this organization united with one founded the same year by Henry Ward Beecher, and the name National American

Woman's Suffrage Association was adopted. The organization in cooperation with numerous state societies worked tirelessly for the extension of women's political rights, and in



BEFORE THE AMENDMENT

The map shows the status of women suffrage on August 1, 1920. The white areas were full-suffrage states, slanting lines indicated Presidential suffrage, squares, primary suffrage, black, no suffrage. A Constitutional amendment to grant suffrage to all women of the United States passed the House of Representatives on May 21, 1919, the Senate, June 4. It was ratified in 1920.

1919 a woman suffrage amendment to the Constitution passed both Houses of Congress. It was sent to the states for ratification, and in August, 1920, this was accomplished. By referring to the map the reader may see the progress of the movement.

WOMBAT, a burrowing mammal belonging to the same order as the kangaroo, having the characteristic pouch for carrying the young (see **MARSUPIALS**). Wombats are found only in Australia and Tasmania. They look somewhat like small bears, are two to three feet in length and have a coat of long, coarse fur, yellowish-black or grayish-brown in color. The head is broad and flat, the eyes and ears are small, and the tail is short. The creatures feed on leaves, roots and vegetables, coming out of their burrows at night in search of food. Their flesh tastes somewhat like pork; the fur is used in making rugs and mats.

WOMEN'S CLUBS. With the increase in facilities for the education of women and with their growing share in public life, came the feeling of the necessity for cooperation along lines in which they were interested. The first societies of women were religious, charitable and social organizations. As educational advantages were extended to women, study clubs sprang up among them, and from these have developed the highly efficient women's organizations of to-day.

At present there exist in the United States a great number of clubs for women. A great many of these clubs are *departmental*, that is, are divided into groups interested respectively in literature, household economies, municipal improvements, politics, and so on, each group cooperating with the others and the interests and activities often overlapping. Others are devoted exclusively to politics, art, travel, domestic science, or are made up of members of some profession.

Within recent years women's clubs have brought about many reforms in school administration and municipal management. They have turned their attention systematically to promoting child welfare, improving the condition of working women and awakening the public conscience generally to a realization of the need of reform. In many cities, owing to their influence, vacant property has been converted into playgrounds or into kitchen gardens for the poor. Prisons, asylums, charitable organizations, dance halls and unnumbered other institutions have felt their influence.

In 1889 an invitation was issued by a prominent club in New York to different clubs throughout the United States to a general meeting. In the following year the General Federation of Women's Clubs was formed, the membership consisting originally of sixty-three clubs. At present the General Federation holds meetings every two years in some large city. The total membership is about 2,000,000.

WOOD, LEONARD (1860-1927), an American soldier and administrator who was the originator of military camps for college students and citizens' training camps, such as that at Plattsburg, N. Y. He was born at Winchester, N. H., and educated at Pierce Academy, Middleboro, and Harvard University, where he was graduated in medicine in 1884. He joined the medical staff of the army, and in 1886 was the medical line officer in Captain



LEONARD WOOD (afterwards Major-General) Lawton's campaign against the Apaches Indians. In 1908 he received the Congressional Medal of Honor for distinguished services in that cam-

paign. He was appointed assistant surgeon of the army in 1888, and in twelve years rose to the rank of major-general of volunteers.

At the outbreak of the Spanish-American War, General Wood (then Colonel) and Theodore Roosevelt organized the First Cavalry, known as the "Rough Riders." Wood was first and Roosevelt second in command of the regiment which is famous for its gallant charge at San Juan Hill.

General Wood was appointed governor-general of Cuba in 1899 and continued in the position until the United States retired from the island in 1902. He displayed rare tact and administrative ability, especially in improving the sanitary conditions of Santiago and Havana. Yellow fever, a former scourge of the island, has been practically unknown in Cuba since General Wood's administration. In 1903 he was placed in charge of a division of the army in the Philippines and in the same year was made a major-general in the regular army. In 1908 he was made chief of the Department of the East, with headquarters at New York. In 1910 he was special ambassador to Argentina, and the same year was appointed chief of staff, retaining the position until 1914, when he returned to the command of the Department of the East.

While he was chief of staff, General Wood inaugurated military training camps for college students and the citizens' training camps, which later were important agencies in training officers for the army. He has always been a strong advocate of military preparedness. When the United States entered the World War, General Wood was transferred to the Department of the South, with headquarters at Charleston, S C. In April, 1918, he was assigned to the command of the 89th Division at Camp Funston, Kansas. The Washington administration did not permit him to take a command in France. From Camp Funston he was transferred to the Central Department, with headquarters at Chicago, in 1919. In 1920 he sought the Republican Presidential nomination, and in 1921 was appointed governor-general of the Philippine Islands by President Harding.

WOOD ALCOHOL, or **METHYLATED ALCOHOL**, a liquid having the appearance and many of the properties of pure alcohol. It is obtained from the destructive distillation of wood, and is used as a solvent for resin and varnishes and as a fuel in the same

way as ordinary alcohol. It mixes with water in all proportions. A mixture of seventy-five per cent water and twenty-five per cent alcohol in an automobile radiator will prevent freezing at a temperature of five degrees above zero, a mixture of fifty per cent each will prevent freezing at twenty degrees below zero. Wood alcohol should never be used medicinally, either externally as a liniment or internally, as it is very poisonous, producing vertigo, coma, blindness and death.

WOOD/BINE. See **HONEY-SUCKLE**.

WOOD CARVING, the art of producing sculpture in wood. Wood carving was probably the earliest form of sculpture. As far as known, the Egyptians were the first wood carvers. Specimens of their work, made more than 4000 B C., are still in existence, and it is quite probable that the Greeks obtained their first ideas of sculpture from the wood carving of these people. The Romans also carved many of their early statues from wood. In the first century of the Christian era wood carving was used in the decoration of churches, and many pieces still in existence show the remarkable skill of the artists and workmen of that time. From the early centuries of the Christian Era wood carving fell into disuse, until about the eleventh century, when it was again revived, and used, as before, in the decoration of churches.

Wood carving as practiced to-day is confined to the ornamentation of altars, pulpits and choir stalls for churches; to a few articles of the most expensive furniture; to the decoration of expensive interiors of dwellings and public halls, and to ornaments. Among European nations the art is practiced with the greatest skill in Tyrol, Switzerland, and some of the provinces of Italy and Germany. Among the Eastern nations the Persians are remarkably skilful in carving wood. The work is finely executed, but shows a tendency to overcrowding, which mars the general effect. The Chinese and Japanese also produce wood carvings of decided merit.

All the finest work is done by hand, with small chisels, shaped for the purpose. Oak, mahogany, ebony and many of the softer woods are used. Before carving, the wood should be thoroughly seasoned. The completed work is usually finished by rubbing down in oil. In the United States but little hand carving is done, though in some manual training schools it is now a part of the course.

WOOD'CHUCK, the popular name of an animal of the squirrel family, common in the United States and Canada. The woodchuck is the American marmot and is often called the *ground hog*. It is of a heavy form, from fifteen to eighteen inches long, blackish or grizzled above and chestnut red below. It feeds on vegetables and is very destructive to crops of red clover and alfalfa. In the winter it hibernates in burrows. There is a popular superstition that the woodchuck first comes out on Candlemas Day (February 2); if it sees its shadow it returns to sleep, because it knows that six weeks of cold weather will follow.

WOOD'COCK, a bird belonging to the same family as the snipe, differing from the latter in having a more bulky body and shorter legs. It is widely distributed over North America, Europe, Northern Asia and Japan. It spends the summers in pine forests and the winters in southern swamps and moist woodlands, where worms, snails and slugs are plentiful. It is active by night and quiet during the day. The bird is about twelve inches long. The upper plumage is an intermingling of ruddy, yellowish, and ash, and is marked with black spots. Underneath, it is yellowish red with zigzag markings. The eyes are large and are set far back. The bill, nearly half the length of the body, is used with great skill in digging worms.

WOOD DISTILLATION, conversion of the volatile substances in wood to obtain charcoal, wood alcohol, acetic acid, acetone, creosote, and wood turpentine. Coniferous as well as deciduous trees lend themselves to distillation. Wood turpentine is a by-product of the former, but the yield of acid is less than with hard woods. The still or retort into which the liquid is heated, the condenser which cools the vapors, and the receiver which collects the distillate, constitute the simplest distillation apparatus.

WOOD ENGRAVING. See **ENGRAVING**, subhead *Wood Engraving*.

WOODEN HORSE. See **MYTHOLOGY**, *Story of the Wooden Horse*.

WOODMEN OF AMERICA, MODERN, a fraternal and insurance society founded in 1883 at Lyons, Iowa, and the following year chartered under the laws of Illinois. It is the largest fraternal benefit organization in America, having a membership of more than a million. The head officer is known as head

consul, and the various geographical divisions, of which there are more than 14,000, are called camps. Since its founding the order has paid out in death and benefit claims more than \$500,000,000. One of the beneficial features of the society is a large and well-equipped tuberculosis sanatorium at Woodman, Colo.

WOODMEN OF THE WORLD, a fraternal and insurance order founded in 1890 at Omaha, Nebr. The organization is divided geographically into three main camps, one of which is the Sovereign Camp of the World, whose executive committee is also the governing body of the entire order. The Woodman's Circle, an affiliated organization, of which Woodmen may become members, is controlled by a body called the Supreme Forest. Woodmen pay old-age benefits and erect monuments to deceased members. By levying a special assessment they were able to pay benefits in all cases of members killed in the World War. Since its founding the order has paid out in benefits more than \$100,000,000. It has more than 13,000 subordinate camps and a membership of approximately 1,000,000.

WOOD'PECKER, the name of a large group of climbing birds, of which there are



YELLOW-BELLIED SAP SUCKER

a number of different species. They have long, straight, angular beaks, adapted to perforating the bark of trees. Their tongues are long, slender and armed with a barbed,

horny tip They can thrust their tongues far out of their mouths and so spear insects in the depths of their burrows Their tongues are also covered with a sticky, slimy substance, that helps to hold their prey When feeding, they usually ascend the tree spirally, aided by the spiny points which terminate their tail feathers They tap here and there on the tree-trunk, searching for the holes in which insects are hidden, and often tear away large parts of rotten trees, for the larvae concealed in them.

The *sap sucker* is a species that is fond of the sap of trees and bores round holes, which it arranges with geometrical exactness in broad bands around the trunk of a tree It especially favors the pines, and in feeding it moves about over the checkerboard of holes, taking the sap from them regularly, as it accumulates. The *woody-billed woodpecker* of the southern United States is a large bird, about twenty-one inches long, bright black and white in color, the male having a large bright scarlet crest Like most of the other woodpeckers, this one excavates its nest in suitable dead trees The *red-headed woodpecker*, the *black and white woodpecker*, the *hairy woodpecker* and the *downy woodpecker* are well known in the Northern states The redheaded woodpecker often lights on the shingles of houses or on a hollow branch and strikes his bill in a noisy clatter, stopping now and then to call out his hoarse, rough note The woodpeckers are found in almost every temperate part of the globe, except that none ever existed in Australia and Egypt See FIACKEE

WOOD FEWEE, a little bird of the flycatcher family, related to the phoebe It is brown on the back and yellowish-white underneath, the quills are brown, with light edges The spread of the wings is about twelve inches The bird has a rapid flight and catches insects with skill Its low, plaintive little note, *pee-a-wee*, may be heard in the woods, all through the long summer, at early dawn and during the twilight hours The birds spend the summer in the United States and Canada, and in winter they migrate to South America The nest is a wonderful structure of mud, grass and moss lined with down and other soft materials, and hangs bracketlike against a beam or tree Two broods are raised annually in spring and autumn See PHOEBE

WOOD SPIRIT See METHYLATED SPIRIT

WOODSTOCK, ONT., the county town of Oxford County, is situated about midway between Detroit and Niagara Falls, on the Canadian Pacific and the Canadian National Rys, and on a line of the Canadian National, which runs from Port Dover on Lake Erie to Owen Sound and other Georgian Bay ports It is also connected with the Michigan Central and Wabash systems by a branch of the Canadian Pacific The city is beautifully situated at the confluence of the Thames River and Cedar Creek Its famous avenues of trees, general attractiveness and healthfulness make the city a favorite summer resort

Woodstock is an important manufacturing and commercial center The leading manufactures include furniture, pianos and organs, textiles, wagons and sleighs, harness, cereals, flour, agricultural implements, automobiles, stoves and furnaces and numerous other products The city has excellent hotels, a collegiate institute and a Y W C A It is also the seat of Woodstock College Population in 1921, 9,935, in 1931, 11,395

WOOL AND WOOLLEN MANUFACTURE Wool, the modified hair of sheep and several species of goats, is, with the exception of cotton, the fiber most extensively used in the manufacture of cloth and clothing Woolens afford warmth without great weight, and are a protection against extreme heat as well as against cold. They are soft and flexible, and of them the most healthful clothing is made

Structure and Grades If we draw a fiber of wool through the fingers from tip to base it feels rough; if we draw it from base to tip, however, it is smooth and soft. An examination of wool through the microscope shows the cause of this difference Wool fiber consists of minute scales or plates, which overlap like the scales on a fish The difference in quality of the fiber is due to the difference of these scales in size and shape

Wool is graded as coarse, medium and fine, according to the length and size of the fiber The finest sheep's wool is obtained from the Merino sheep and varieties that have been developed from this breed The wool from which alpaca and mohair are made is that of the Cashmere goat, from which the soft, silken Persian shawls and rugs are made Some wool resembles fur in fineness.

For purposes of manufacture, wool is divided into *carding wool*, which includes that

of short, curly fibers, and *combing wool*, which includes the long fibers. The coarsest of the long fiber wools are known as *carpet* and *blanket wools*. The quality of wool varies in the same fleece, that on the shoulders and sides being the best and that on the back the poorest.

Production. The demand for wool has not decreased by reason of the introduction of substitutes. The cotton market has to meet the competition of rayon products, though some rayon has a cotton base, much of it has a wood foundation. Though no competing textile challenges woolen cloth, in the manufacture of woolen goods there is frequently considerable adulteration, "all-wool" fabrics incline to be increasingly expensive, for not always is the supply in keeping with the demand.

The principal wool-producing countries are Argentina, Australia, the United States, British India, China, Italy, Russia, South Africa, Spain, and New Zealand. Canada is not a large world factor, for the Dominion has only about 3,500,000 sheep. The number of sheep in the United States averages somewhat more than 50,000,000 from year to year, and the fleeces secured from them exceeds 350,000,000 pounds. The entire wool production of the world is about 3,500 million pounds.

Manufacture. The following are the chief processes employed in making woolen cloth.

When the wool is brought to the factory, it is carefully sorted, and that having the same grade of fiber is placed together. It is then thoroughly cleaned by being dusted, scoured with soap or lye and hot water, and then rinsed. After this, if colored cloth is to be made, the wool is dyed. It is then dried and is ready for the second important step in the process, that of preparing it for the loom.

The dried wool is first run through a machine, which removes any burs that may have adhered to the fiber. It is then run through the *picker*, which pulls all of the little tufts of wool apart and also enables the manufacturer to mix wools of different colors in any proportion desired. By mixing white and brown or blue and black or blue and gray, many very pleasing effects are obtained. After picking, the wool passes through the carding machines, of which there are usually three. Each of these draws out the fiber and straightens it and places the wool in the form of a loose band, or roll. Each successive ma-

chine straightens the fiber and reduces the size of this band, making it each time proportionately stronger. When the wool leaves the third card, it is in the form of a *sliver*, an untwisted yarn a little larger than the heavy crocheting yarn. As it comes from this machine it is wound upon large spools, or bobbins, and is ready for spinning.

The spinning is done on the mule jenny, and a large number of threads are spun at a time. The size of the thread and the hardness of the twist depend upon the way in which the machine is gauged. For a fine thread that is hard twisted, a machine which revolves very rapidly and also draws the thread out rapidly, is necessary. The spun yarn is wound upon spools ready for being placed in the loom. The arrangement for this consists of frames upon which these spools are placed in such a position that the thread unwinds from them directly, to make the warp of a width and number of threads desired. The woven cloth is finished in the style desired, possibly re-dyed, pressed and wound into bundles containing about fifty yards each, in which form it is placed upon the market.

The manufacture of worsted is much like the production of woollens. Threads for woolen goods are carded, but the fibers are left mixed and matted so that the thread is irregular. Worsted thread is not only carded but it is combed as well. The fibers lay parallel to each other and the thread is regular with the short fibers removed. The thread also presents a brighter appearance, a distinct pattern and a smooth weave.

The principal styles in worsteds are cashmeres, voiles, merinos, crepe-de-chines, de-laines and materials for coats and trousers.

Related Articles. Consult the following titles for additional information:

Alpaca	Sheep
Cashmere Goat	Shodd
Dyeing	Spinning
Felt	Textile
Fiber	Tweeds
Flannel	Weaving
Mohair	Worsted

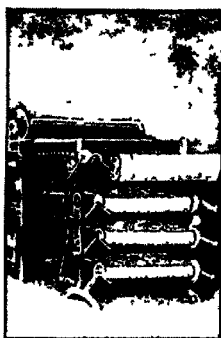
WOOLCOTT, ALEXANDER (1887-), an American author and critic, born in New Jersey and educated at Hamilton College and Columbia University. He spent two years in France as an enlisted man, and was one of the editors of *The Stars and Stripes*. Woolcott wrote several books, the most successful being *While Rome Burns*. Other volumes of note are *Going to Pieces* and *Two Gentlemen and a Lady*.



1



2



3



4



5



6



9



7



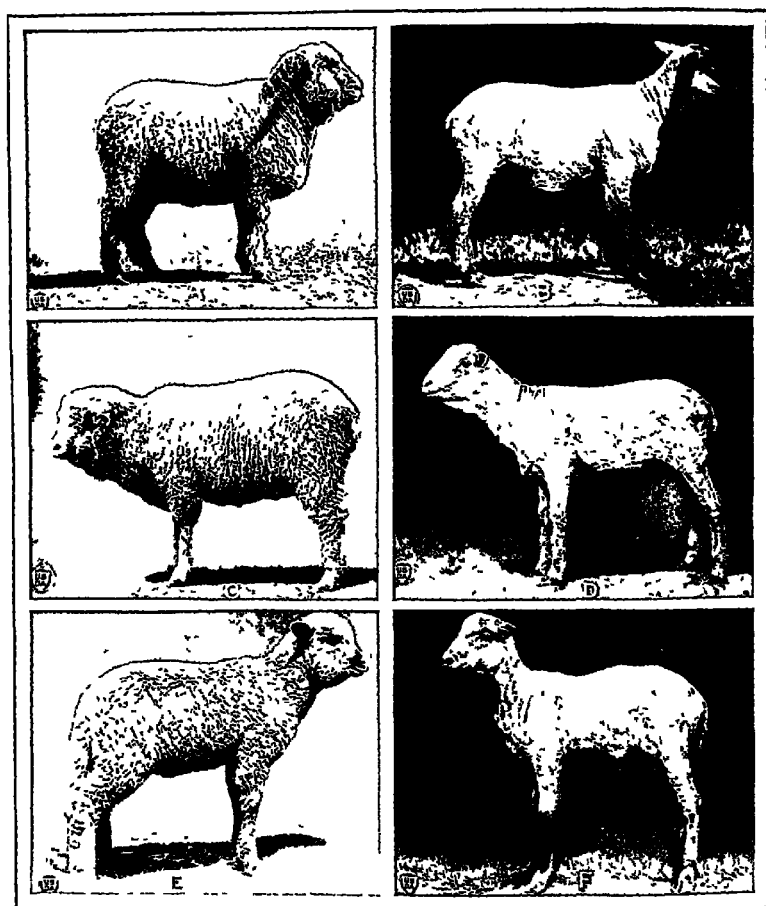
8

WOOL

1 Shearing of sheep
2 Sorting and grading

4 Combing
5 Drawing
6 Spinning

7 Weaving
8 Woolen factory
9 Products



THREE MARKET GRADES OF LAMBS

Wool buyers do not trust appearances, they handle animals to discover their qualities. In the illustrations, A and B represent choice lambs, woolled and after shearing. C and D are examples of medium lambs, woolled and shorn. E and F exhibit the lowest grade, cull lambs, before and after shearing.

WOONSOCKET, R I, in Providence County, 15 miles northwest of Providence, on the Blackstone River, and on the New York, New Haven & Hartford Railroad. There are several bus and electric lines, also a landing field and an airport. The principal manufactures are woollens, worsteds, cotton and rayon goods, knit goods, rubber rolls and thread, machinery, automobile accessories, awnings, brushes, sheet metal products and cigars. Important institutions and buildings are Mount St Charles Academy, Harris Institute Library with 55,000 volumes, two hospitals and 23 churches, and the national home of L'Union St. Jean Baptiste. A magnificent bridge crosses the river. There are four parks covering 109 acres. The city was incorporated in 1888, it was formed by the consolidation of several factory villages (but the original Woonsocket was not included). Population, 1930, 49,376.

WORCESTER, wos'ter, Mass., the second city in size in the state, one of the county seats of Worcester County, 44 miles west of Boston on the New York Central, the Boston & Maine and the New York, New Haven & Hartford railroads. It has one landing field. It is one of the most important manufacturing centers in New England and has the largest wire factory in the world.

The city is noted for its large number of excellent buildings, chief among which are a city hall, a municipal memorial auditorium, a courthouse, a public library, with four branch Carnegie libraries, a Federal building, the Bancroft Hotel, the art museum, the state armory, a state asylum for the insane and the buildings of the women's club, the American Antiquarian Society, the Worcester Society of Antiquity and the Young Men's and Young Women's Christian associations. The educational institutions include Clark University, Clark College, College of the Holy Cross (Roman Catholic), the Worcester Polytechnic Institute, Assumption College (French Catholic), the Worcester Academy for boys, and a state teachers' college.

There are a number of pleasant summer resorts in the vicinity, including Lake Quinngamond and Mount Wachusett.

Worcester was first settled in 1673, but was abandoned on the outbreak of King Philip's War, two years later. A second attempt in 1684 was also given up because of Indian depredations, and the first permanent settlement was not made until 1718. In

1722 Worcester was incorporated as a town, and in 1848 was chartered as a city. Worcester is the birthplace of the historian George Bancroft, who was also Secretary of the Navy. Population, 1930, 195,311.

WORDEN, JOHN LORNER (1818-1897), an American naval officer, born in Westchester County, N. Y. He entered the navy in 1835 and became a lieutenant eleven years later. In March, 1862, he was in command of the *Monitor* during the famous battle with the *Merrimac*, in Hampton Roads. In this engagement his eyesight was seriously impaired by the explosion of a shell. He was able to take subsequent commands, however, and served with gallantry until the close of the war. In 1870 he became head of the Annapolis Naval Academy and was made rear-admiral in 1872. He retired in 1886.

WORDSWORTH, words'worth, WILLIAM (1770-1850), an English poet, a leader in the Romantic movement which transformed

English poetry early in the nineteenth century. He was born at Cockermouth, Cumberland. While at a grammar school at Hawkshead, he spent much time in solitary rambles, and the love of nature manifest at this time grew throughout his life and was his most prominent characteristic. He was graduated from Cambridge in 1791, and later in the same year he went to France. At first he felt the most ardent sympathy with the Revolution, but the excesses which developed out of it shocked him greatly, and as time went on he settled down to a staid conservatism. Many of his contemporaries, ardent republicans like Byron and Shelley, condemned him severely for the change. Shortly after his return from France, Wordsworth published his first poems, *An Evening Walk* and *Descriptive Sketches* taken during a *Federician Tour among the Alps*, which, although they were written somewhat after the manner of Pope, yet contained signs of the new poet's peculiar genius.

In 1795, Wordsworth, with his sister Dorothy, settled at Racedown in Dorset, where they were visited by Coleridge, who



WILLIAM
WORDSWORTH

induced them to remove to Alfoxden, in the immediate neighborhood of his own residence at Nether Stowey. Here the two poets held daily intercourse, and after a twelve-month they published *Lyrical Ballads*, in literary copartnership. This volume contained as Coleridge's contribution *The Ancient Mariner*, and as Wordsworth's, among others, *We are Seven* and *Lones on Tintern Abbey*. Although the poems were received with almost complete public indifference, yet Wordsworth felt that he had found his mission, and after a winter spent in Germany, he and his sister settled at Grasmere, one of the most beautiful places in England, where he gave himself up to literary work. Thenceforth his life was marked by few incidents. Those worth noting are his marriage, in 1802, with Mary Hutchinson; his appointment, in 1813, to an inspectorship of stamps, and his removal to Rydal Mount; several journeys into Scotland and to the continent, his acceptance of a D. C. L. degree, conferred upon him in 1839 by the university of Oxford, and his accession, in 1843, to the laureateship, on the death of Southey.

The public and the critics were slow to recognize Wordsworth's ability, refusing utterly to accept his idea that poetry may deal with simple and natural subjects, presented in simple and natural language. Coleridge, Lamb, De Quincey, Southey, Keats and others were always his admirers, however, and his faith in his own mission was too strong to be shaken. His great philosophic poem, which, in his own phrase, was to be the Gothic cathedral of his labor, received only a fragmentary accomplishment in *The Prelude*, *The Excursion* and *The Recluse*. Yet enough was achieved in his smaller poems to justify his own conception of himself as a "dedicated spirit," and to set him apart among the greatest of England's poets. His intense sympathy with nature and his firm belief in the brotherhood of man find expression in all of his poems; and his language, although always simple, sometimes rises far above what he insisted it should be, the unadorned language of prose. Among the most beautiful of Wordsworth's poems are the *Ode on the Intimations of Immortality*, *Ode to Duty*, *the Solitary Reaper*, *To a Highland Girl*, *I Wandered Lonely as a Cloud* and *Yarrow Remitted*. His sonnets are among the finest ever produced by any English poet in any age.

WORK, a general term for effort expended toward a given end, but it also implies motion against a resisting force, that certain results may be obtained. A man who lifts a weight, in labor or in play, performs work; the resisting force he encounters is the force of gravitation. The impulse which sends the electric current along a copper wire to light a room or run a motor performs work. The water which in falling wears away solid rock performs work just as surely as does that which falls over a water-wheel and turns the machinery of a mill. Work is accomplished whenever one body transfers its energy to another body.

WORKHOUSE, a name widely applied to institutions for the maintenance of paupers. In the United States these establishments where vagrants, drunkards and other such offenders are detained are sometimes called workhouses, but more properly they are called houses of correction. In an earlier day it was quite usual to supply religious and secular instruction to inmates, but the religious aspect has of late years been neglected. However, the inmates are taught to labor and acquire knowledge of trades and occupations, and learn habits of cleanliness, industry, and order, the work assigned accords with capacity and ability.

WORKMEN'S COMPENSATION LAWS. See **EMPLOYER'S LIABILITY**.

WORLD'S COLUMBIAN EXPOSITION, an international exposition of arts and industries, in commemoration of the four hundredth anniversary of the discovery of America by Columbus. It was built in Jackson Park, Chicago, on the shore of Lake Michigan, and was open from May 1 till November 1, 1893. The construction of the exposition occupied two years, besides the time consumed in preparatory work, such as study, investigation and advertising. The exposition was formally opened May 1, 1893, Grover Cleveland, then president of the United States, setting the intricate machinery in motion by pressing a button connected with electrical appliances. His opening address was listened to by an assemblage estimated at fully 400,000 people. The exhibition comprised over 400 buildings, covering fully 200 acres of ground. Fifteen of these buildings were occupied by special classes of exhibits, of individuals, firms, states and nations, every important nation on the globe being represented in some one or more de-

partments The largest building was the Manufactures and Liberal Arts Building, 787 by 1,687 feet in size, covering nearly forty acres, including the surrounding colonnade, and costing \$1,500,000 Its enormous roof was supported by the largest steel arches ever used in building construction Besides the buildings used for the exposition proper, nearly every state in the Union and many foreign nations erected buildings for social and exhibition purposes.

The architectural beauty of the whole exposition was one of its greatest triumphs, and, indeed, it has rarely, if ever, been excelled The center of the main group of buildings was the Court of Honor, consisting of a wide plaza, with a lagoon in its center, having at one end a beautiful electric fountain, sculptured by McMonnies, and terminated at the other by a graceful semi-circular peristyle

The whole cost of the exposition to its managers before the opening was more than \$18,000,000, the cost of operation exceeded \$7,000,000, while the expenditures by states and foreign nations were not less than \$8,000,000 Adding to this enormous sum the expenses incurred by private exhibitors, the total cost of the exposition was probably \$40,000,000 The attendance from the opening to the closing day was 27,539,041, or slightly less than the attendance at the Paris Exposition of 1889 The largest attendance upon any one day was on Chicago Day, October 9, when 716,881 people passed through its gates One of the most novel and interesting features of the exposition was the Midway Plaisance, a boulevard 600 feet wide, connecting Jackson and Washington Parks Along the sides of this avenue was arranged a motley collection of amusement enterprises, the most interesting consisting of representative scenes from the life of various peoples of Europe, Africa and the Orient.

An interesting and important feature of this fair was the World's Congress Auxiliary consisting of special congresses on all the main topics of human interest, social, physical, industrial, educational, philosophical, commercial and religious The congresses of religion presented features of peculiar interest, being attended by leading representatives of the religions of Asia and Africa as well as those of Europe and America

WORLD COURT See PERMANENT COURT OF INTERNATIONAL JUSTICE



WORLD WAR (1914-1918), the greatest war in human history, and the only one that drew into its vortex nations of every continent It is sometimes called the GREAT WAR and the WAR OF THE NATIONS, but no name has been found or can be suggested which can fittingly describe its magnitude

In respect to number of men engaged and casualties, amount of money lavished, human effort expended, number of nations involved and changes in political and social structure resulting from it, the World War has no parallel among the conflicts which men have been fighting from the dawn of history While it loosed all the hatred and brutality inherent in human nature, bringing out primitive passions and racial antipathies in all their rawness, this war also served as a background for nobility and courage almost divine, and it illuminated with startling clearness some of those fundamental conceptions of freedom and justice upon which the future security of humanity rests

Causes of the War. These causes were rooted deep in past conditions of society, government, and economic and political relations No one would say that any particular event was in itself responsible for the World War It was, indeed, like the breaking out of a sore on the surface of a world that for centuries had been harboring the germs of hideous diseases It does not follow, however, that all nations engaged in the conflict were equally blameworthy No discussion of the causes of the war can ignore the ambitious plans of the German imperialists, to whom the declaration of war was an opportunity to carry out certain well-defined aims for German domination of the world

The General Situation in 1914. A general European war had been foreseen and prophesied by many observers long before the actual crisis Prophecies of this nature were based on certain conditions in Europe which held dangerous possibilities and may

be regarded as underlying causes of the war. Outstanding elements in the situation were racial antagonisms and the development of nationalism. In 1871 Germany forced on France a peace which violated the principle of national unity when Alsace-Lorraine was forcibly annexed to the empire. The French, a proud, high-spirited people, never forgave or forgot this humiliation, and the two neighboring nations were friends only on the surface.

In Austria-Hungary the racial problem was acute. That monarchy was a loose union of many diverse peoples, possessing no bond of loyalty or of common interest. Among these were the Bohemians, or Czechs, mindful of their lost independence, and determined to maintain their national consciousness, and the Southern Slavs, in Bosnia, Croatia and other sections, with visions of the establishment of an independent Slavic state. The Pan-Slavic agitation was becoming more and more a source of anxiety to the Austrian government, and the situation was complicated by the known sympathy of Russia, the greatest of the Slav nations, for the aspirations of the Slavic people both in Austria-Hungary and in the Balkans.

The Balkan states themselves presented a baffling problem. Here the mixture of races was so complicated that an accurate geographic arrangement of peoples, in conformance with the principle of national unity, was a hopeless task. The Balkan wars of 1912-1913 had nearly forced Turkey out of Europe and had left Serbia, Montenegro, Rumania and Greece with increased territory and augmented national consciousness. Rumanians, Serbians and Greeks all had their dreams of bringing under their respective flags neighboring territories peopled by their own kinsmen. Bulgaria, on the other hand, smarting from its recent defeat, was nursing a sense of injustice and hoping for a day of revenge.

Added to this conflict of aims and hopes was the antagonism between Slav and Teuton. The defeat of Turkey in 1912-1913 was a blow to both Germany and Austria-Hungary, for it increased the prestige of the Slavs, and made more real the menace to the integrity of Austria-Hungary. Germany was no less interested in preserving the Hapsburg monarchy than was the Austro-Hungarian government itself, for a disrupted monarchy meant a check to Germany's plan to dominate

the Balkans and to secure a gateway to the East. It meant also the collapse of Emperor William's *Mittel Europa* (Middle Europe) scheme.

In discussions of the background of the war much has been said of Pan-Germanism, which was the spirit of national consciousness carried to the extreme limit. The Pan-Germans, who included not only militarists, but historians, scientists, educators and statesmen, conceived the German people, no matter where they were located, as permanently retaining their nationality. The most ambitious of this group believed that it was the mission of Germans to extend their *kultur* (culture) over the world, and to accomplish this by conquest, if necessary. In this connection the theory was advanced that the German was a superior being, destined to dominate other peoples, most of whom were thought of as decadent. While many German authorities denied that the Pan-German doctrine represented official Germany, or a majority of the people, the extensive propaganda of its adherents certainly affected the German nation, and the speeches and acts of the emperor clearly pointed to his sympathy with the theory.

Military preparedness was a necessary corollary of these national ambitions and racial jealousies. Standing armies, huge appropriations for armaments, highly-developed munition factories and the other accessories of war turned Europe into an armed camp; with symbols of war on every hand pacifism waged a losing fight with militarism. Germany's preparations for a possible war were more complete than those of any other nation, partly because of the splendid industrial organization of the empire, and partly because of the spirit of the German people themselves. Bismarck, who had launched the empire on its career by a policy of "blood and iron," was the great national hero, and the necessity of militarism was believed in by the people as a whole. They accepted burdensome taxes as essential to the welfare of the Fatherland.

In 1913 a new army bill in Germany caused a frenzied increase in war preparations in Europe generally, which did not add to the possibilities of peace. Another factor in the situation was the building up of a great German navy by Emperor William, a procedure that England viewed with concern. As a result, the two nations engaged in a

race in naval armaments, with England in the lead, and Germany following with the second largest navy in the world

Germany's growth in naval strength was a contributing cause to the formation of the Triple Entente by England, Russia and France, one of those military alliances that were another development of national rivalries. In 1882 Italy had joined with Germany and Austria in the Triple Alliance, for common defense. France and Russia, fearing this strong combination, formed a Dual Alliance in 1893, and in 1907 they were joined by England, which was disturbed by Germany's naval policy. It may readily be seen how delicately-balanced was a peace condition with the great powers thus ranged against each other. In fact, between 1905 and 1914 there were several crises, each of which almost brought on war.

Economic rivalry also had a part in setting nation against nation. The colonial expansion of the other nations, notably Great Britain, and the advantages resulting therefrom spurred Germany on to securing its place as a great colonial power, and thus brought about the inevitable clash of interests in the colonized and undeveloped parts of the world. In England, Germany's naval program was looked upon chiefly as a plan to overthrow British commercial supremacy. In such manner was the stage set for the great drama of 1914-1918.

Outbreak of the War On June 18, 1914, the heir apparent to the Austrian throne, Archduke Francis Ferdinand, and his wife were assassinated while on a visit to Sarajevo, the capital of Bosnia. The assassin, a young Bosnian named Gavrilo Princip, was one of the principals in a scheme to incorporate Bosnia in a Greater Serbia. Bosnia, including Herzegovina, was peopled by Serbs who had never become reconciled to the annexation of the province by Austria-Hungary in 1908. Francis Ferdinand was selected as a victim because he was friendly to the idea of placing the Slavs of the Hapsburg monarchy on an equal footing with Germans and Magyars (Hungarians), and the Serbian plotters believed that such a plan would imperil their own scheme.

The affair took on an international aspect because the Austrian government believed that the crime was plotted in Belgrade, the capital of Serbia, by the Serbian government itself. The erection of such a state as Greater

Serbia would disrupt the monarchy by paving the way to other Slavic secessions. Accordingly, the Austrian government decided to crush the Serbian movement once for all, and to do so by dealing directly with Belgrade.

On July 23 a stern ultimatum was sent to the Serbian government, ten demands being submitted, and forty-eight hours being given for a reply. These demands required that Serbia should dissolve all societies engaged in Pan-Serbian propaganda, dismiss all teachers or government officials hostile to Austria, suppress publications advancing the movement, take measures to stop the smuggling of arms across the border, permit Austro-Hungarian agents to assist in the suppression of the movement, and Austro-Hungarian representatives to take part in the investigation and punishment of persons accused of complicity in the crime. Serbia's reply to these demands was conciliatory, but Austria seems to have made them purposely unacceptable. The demands that Austrian agents be permitted to help suppress the anti-Austrian movement and that Austrian representatives assist in the judicial proceedings against the plotters were protested against as infringing on the sovereignty of Serbia. Moreover, the smaller state expressed its willingness to submit the disputed questions to The Hague Tribunal or to the decision of the great powers. Austria professed to find the answer unsatisfactory, and on July 28 issued a declaration of war.

The Flame Spreads The great powers were keenly interested in the outcome of the Austro-Serbian controversy. Germany, having a vital interest in the integrity of the Hapsburg monarchy, supported Austria's attitude and was suspected in a meeting at Potsdam in July, presided over by Emperor William, of having urged its ally to precipitate a crisis. Russia was as vitally interested in preserving the balance of power in the Balkans and of saving Serbia from a state of vassalage. Here again came to the surface the old animosity between Teuton and Slav, with the German alliance eager to extend German and Austrian influence in the Balkans, and Russia determined to play the rôle of "big brother" to the small Slavic states. France, as an ally of Russia, naturally sided against the Teutonic states, but Italy, the third member of the Triple Alliance, held aloof from its allies because they were not entering a war of defense.

The diplomatic wires grew hot during the tense week following July 23. On the 28th Russia openly announced its intention of mobilizing its army against Austria if troops crossed the Serbian border, and on the 29th partial mobilization was ordered. On the same day Sir Edward Grey, the British Foreign Secretary, who had previously made unsuccessful efforts to arrange a conference of the powers to settle the dispute, urged the German government to suggest a method of preventing war between Russia and Austria. No satisfactory basis of agreement could be reached, however, and on the 31st Germany sent an ultimatum to Russia, demanding that Russia cease mobilizing within twelve hours. As the Russian government declared that it was impossible to stop the process, Germany on August 1 declared a state of war against Russia and at the same time requested a statement from France as to its intentions in the event of a war between Germany and Russia. The reply being unsatisfactory, Germany declared a state of war against France on August 3.

Germany, in the meantime, had been hoping that Great Britain, though in agreement with Russia and France, would remain neutral, and had informed the British government that the territorial unity of France would be preserved if Great Britain kept out. It was further stated that no guarantee would be made regarding French colonies. Great Britain refused to promise its neutrality, and to the last moment labored for a compromise. On August 2, however, France was notified by England that its northern coast would be protected from attack by the German fleet. This partial intervention was followed on August 4 by a declaration of war against Germany by Great Britain because of the violation of Belgium's neutrality.

In 1839 the great powers, including Prussia, had entered into a treaty guaranteeing the independence and neutrality of Belgium, and in 1870, when France and Germany were at war, a separate treaty was signed between Great Britain and each of the belligerents, by which Great Britain agreed that if either nation should violate Belgian neutrality the other could rely on England as an ally.

On July 31, 1914, the governments of Germany and France were requested by Great Britain to state their attitude on the question of Belgian neutrality. France replied that in

case of war such neutrality would be respected. Germany's reply was evasive, and on August 2 the German Foreign Minister presented to the Belgian Minister an ultimatum demanding that the German forces be permitted to pass through the country (the easiest way to France). In case of refusal Germany warned Belgium it would be treated as an enemy. To its undying honor Belgium declined thus to lend itself to the subjugation of France, and refused the demand, at the same time appealing to Great Britain, France and Russia to carry out the terms of the treaty of 1839.

On August 4 Great Britain sent an ultimatum to Germany demanding a favorable reply to its request that Belgium be unviolated, giving the German government until midnight to reply. As no reply was received, England entered the war on midnight, August 4, and thus on August 5, Germany and Austria found themselves surrounded by enemies. Italy, their ally, had declared on August 1 that it would remain neutral. Montenegro elected to go to the defense of Serbia within a few days, and Japan, Britain's ally in the Far East, entered the struggle on August 23. Turkey within a few weeks became an ally of the Teutonic powers.

The list of war declarations for 1914 is as follows:

Austria-Hungary, on Serbia	July 28
Germany, on Russia	Aug 1
Germany, on France	Aug 2
Germany, on Belgium	Aug 4
Great Britain, on Germany	Aug 4
France, on Germany	Aug 4
Austria-Hungary, on Russia	Aug 6
Montenegro, on Austria-Hungary	Aug 7
Montenegro, on Germany	Aug 9
Serbia, on Germany	Aug 9
France, on Austria-Hungary	Aug 10
Great Britain, on Austria-Hungary	Aug 12
Japan, on Germany	Aug 23
Austria-Hungary, on Japan	Aug 27
Austria-Hungary, on Belgium	Aug 28
Russia, on Turkey	Nov 3
France, on Turkey	Nov 5
Great Britain, on Turkey	Nov 6

German Drives in the West. Germany was superbly prepared for war, and its mighty military machine lost no time in getting into action. The military operations at once resolved themselves into two great campaigns, for Germany had to meet enemies on its widely separated eastern and western frontiers. Immediately after the war broke out the German strategy became clear. A quick, de-

cursive dash into France was to be followed by the shifting of most of the victorious troops from the west to meet the Russian millions on the east. This plan failed only by the narrowest of margins, partly because the Belgian resistance delayed the advance and gave the French time to organize, and partly because the Russians mobilized more rapidly than



A YEAR OF WAR IN THE WEST

had been expected. When the campaign in France was at a crisis, therefore, the Germans were compelled to weaken their offensive by sending thousands of soldiers to defend their eastern frontier against strong forces of the czar.

In Belgium The western campaign developed with great rapidity. The Germans appeared before Liège on August 5, and took the city on the 8th. Before the end of August they had taken practically all of Belgium except Antwerp and a narrow strip on the coast. The Belgian army was driven into Antwerp, but early in October was driven out again after a ten-days' bombardment. A part of the Belgian army succeeded in making its escape along the coast and joined the French forces south of Ostend, but about 20,000 took refuge in Holland and laid down their arms. The success of the Germans in pounding their way into Antwerp and other strongly fortified towns was chiefly due to the superiority of their artillery, particularly the 42-centimeter Krupp siege guns.

On the Marne and the Aisne During the last week in August and the first week in September there took place one of the most remarkable military movements in all history. The German army, of probably 1,000,000 men, advanced in a wide sweep across France almost to the gates of Paris before its advance was checked. In two weeks the main German army advanced over 150 miles. Opposing them was a large force of French soldiers under General Joffre, and a constantly increasing number of British soldiers under General Sir John French. After the fall of Antwerp the extreme left of the allied line was held by Belgian troops led by King Albert in person. While the Germans were occupied in Belgium, the main French armies had made unsuccessful attacks on Alsace and Lorraine, chiefly for sentimental reasons. It was the German plan, therefore, to reach Paris before the French line in the north could be adequately strengthened. This plan, however, miscarried. On September 2 the seat of the French government was moved to Bordeaux, and Paris prepared for a siege. The German right under Von Kluck, however, swept to the east of Paris, thus exposing its flank to the attack of the strong Paris garrison. For five days, September 6th to 10th, the Germans held their positions along the Marne River. Here was fought the greatest battle of the war up to that time and one of the greatest battles of all history. The Marne marked the high tide of German invasion.

By the 12th of September the whole German army was in retreat along the lines over which it had advanced. The retreat, however, was masterly, and in spite of the superior and increasing number of the allied forces, they were unable to turn the defeat into a rout. On the hills along the River Aisne the German retreat came to a halt. Here they retired to strong fortified positions previously prepared for them, positions so strong that the allies could not drive them out by direct attack. The allied right, too, found it impossible to turn the German left, and there remained only the possibility of turning the extreme German right. This attempt was first made about September 15, but was repulsed after the allies had penetrated as far as Saint Quentin. The next flanking movement came in the neighborhood of Cambrai, and the third near Arras, these failed in turn. The German line was now vastly extended from its original position, and as the allies

moved northward the Germans kept pace. At the end of September the German attack on Antwerp began, and the flanking movement of the allies became in fact an attempt to save this fortress and the Belgian army. But the allies were too late.

After the capture of Antwerp (October 10), the Germans, by taking Ostend, placed their right flank on the sea coast. Two days later the allied forces reached Dunkirk, thus ending the possibility of flanking movements by either side. The battle-front now extended from the English Channel to Switzerland.

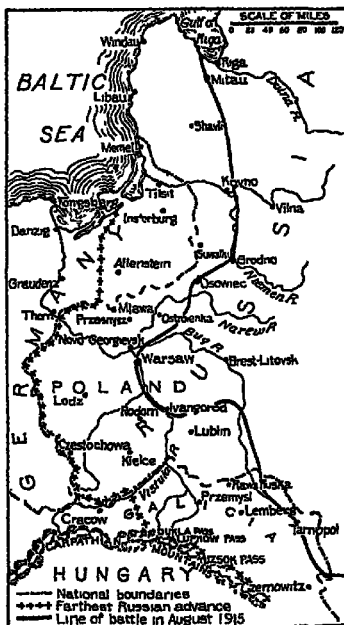
The Battle of Flanders In October the German army attempted to advance along the coast to Calais, presumably with the object of establishing a base for an invasion of England. For five weeks the battle raged along the canals and the River Yser. No other conflicts during the war were so bloody. In the region of Nieuport, Dixmude and Ypres, the battle raged incessantly, but to no purpose. In spite of enormous masses hurled forward by the Germans, the allied lines held firmly. At the end of five weeks the battle-line was practically unchanged.

Deadlock in the West From October, 1914, to August, 1915, the battle-front, as shown in the accompanying map, was little changed. There were occasional brilliant successes, but only of local importance. In the neighborhood of Soissons the Germans made a considerable gain, and at the northern end the allies made several gains which straightened the line. In Alsace the French advanced about 10 miles, but they were unable to drive the Germans out of Saint Mihiel. On the whole, the entire line, over 400 miles long, settled down to a condition of siege unprecedented in history. After October the center of interest was transferred to the eastern frontier.

The Eastern Campaign In the east Poland became the great battlefield, for the chief objective of the Russians was the conquest of Galicia, or Austrian Poland, while the Germans sought the conquest of Russian Poland. During the first month of war the Russians mobilized with unexpected rapidity, advanced in force through East Prussia, and for a few days threatened serious consequences. On September 1 the terrible rout at Tannenberg ended the danger from this source, and made Von Hindenburg one of the great figures of the war. Gradually the Russians were forced back to the Niemen, where

they took a new hold and later carried their line back to the German frontier. Here a deadlock arose like that in the west.

Meanwhile, in Galicia, Russia was winning tremendous success. Tarnopol and Lemberg fell, Przemyśl was besieged, and by October 1 the Austrians were driven back to within 50 miles of Cracow. At this point the Germans launched a strong offensive movement against the Russian center, which was driven back over 100 miles to the permanent defenses of Ivangorod and Novo Georgievsk. This retreat of the center compelled the Russian left to retreat in Galicia, but the relief to the Austrians was only temporary. The German advance was only seven miles from Warsaw when the Russians, by a threatened flanking movement, compelled a retreat to the German border. Once again, in December, January



A YEAR OF WAR IN THE EAST

and February, the Germans slowly advanced on Warsaw, but were unable to take it. In East Prussia the Russians advanced in force in February, but after the ten-days' battle

of the Mazurian Lakes they were compelled to retire. In Galicia the Russians made themselves masters, finally took Przemyśl on March 22, 1915, seized all the passes of the Carpathian Mountains, and were ready to advance in force across the plains of Hungary.

New German Offensive Just as an invasion of Hungary seemed certain a combined German and Austrian army led by Von Mackensen routed the Russians and drove them out of Galicia, forcing them back to the position they held at the beginning of the war. By the first of August the Germans were again at the gates of Warsaw and on the 4th the city was taken. By this campaign the central powers regained the lost territory and rendered a new Russian offensive impossible for several months.

Turkey in the War On October 29, 1914, two German warships that had been sold to Turkey, but were still operated by German officers and crews, bombarded Odessa and other ports on the Black Sea. Turkey's explanation of this act was unsatisfactory and on November 3 Russia declared war on the Ottoman Empire. Great Britain and France took like action on November 5. The Turks made unsuccessful attempts to invade Egypt and Russian Caucasus. On February 15, 1915, a fleet of the allies attempted to force an entrance into the Dardanelles and take Constantinople. A large army was landed on Gallipoli Peninsula to assist the fleet. The enterprise failed, and the troops were withdrawn at the end of six months, though it was later known that the Turks were out of ammunition and were ready to capitulate when the allies withdrew. The German emperor looked upon Turkey's entrance into the war as a blow to the integrity of the British Empire and the French colonial empire, as he expected the Mohammedans in these empires to start a Holy War. In this he was completely disappointed.

The War in Asia. Japan, as has been intimated, entered the war as the protector of allied interests in the Far East. On August 19, 1914, an ultimatum was sent to the German Foreign Office requesting Germany to surrender the leased territory of Kiaochow, China, which the German government had acquired in 1897. Upon refusal of Germany to comply, Japan declared war on August 23, and shortly afterwards began a siege of the port of Tsingtau. On November 10 all of the leasehold was surrendered.

With German power in East Asia thus overwhelmed, the British could give their attention to an offensive against the Turks in Mesopotamia, in order to destroy the German threat to Egypt and the Suez Canal, and to pave the way for an advance into Asia Minor, the heart of the Turkish Empire. Early in the war it was apparent to the entente allies that a blow should be struck at German pretensions in Asia Minor. The *Mittel Europa* scheme of Germany had for its object the control by the Germans of a path southeast through Europe by which Berlin could control the entrance into Asia through Turkey. In Asia Minor the Germans had concessions which justified the hope of ultimate control of a strip of territory to the Persian Gulf. Their railroad already extended to historic Bagdad. If a direct route from Berlin through to the seas south of Asia were established, Great Britain could one day be attacked in India and North Africa, in pursuance of the German dream of world domination.

In November, 1914, the British routed the Turkish garrison at Basra, sixty miles north of the Persian Gulf, and then advanced to Kurna, at the confluence of the Tigris and Euphrates rivers. Moving steadily northward through the spring and summer of 1915, the victorious troops defeated the enemy before Kut-el Amara, on the Tigris, on September 28, and by November had reached a point eighteen miles from Bagdad. Here the British army, which was commanded by Major-General Townshend, was defeated by a greatly superior force and driven back to Kut-el-Amara. In Persia and Turkish Armenia the Russians won several victories over the Turks in 1915, and it was hoped that at the end of the year they might be able to raise the siege of Kut-el-Amara.

German Colonies Most of Germany's colonial empire was lost early in the war. On August 29, 1914, German Samoa surrendered to an expeditionary force from New Zealand, and on September 11 Australian troops captured the capital of the Bismarck and Solomon islands, German New Guinea was occupied two weeks later. The Japanese, by the end of October, had taken possession of the Marshall, Marianne and Caroline islands. In Africa, Anglo-French forces captured Togoland in August, 1914, and during 1915 occupied German Southwest Africa. In December of that year it was announced that

a force had been raised in South Africa to carry out the conquest of German East Africa. This was speedily accomplished.

Campaign in the Balkans. Serbia, with the aid of a small army of hardy Montenegrins, was able to offer a stiff resistance to invading Austrians, who were driven out of Belgrade in December, 1914, with heavy losses. Austrian defeat was due in part to the Russian invasion of Galicia, which forced Austria to withdraw large numbers of its troops to that theater of war. The good fortune of the Serbs was short-lived, however. The campaign left the country impoverished and exhausted, and all prepared to cope with a new enemy on its eastern border.

In October, 1915, after months of deliberation, the Bulgars decided to throw in their lot with the Teutonic powers, as Germany and Austria were able to promise them a better territorial settlement than the entente was disposed to offer. In October a Bulgarian army joined the Austro-German forces under Field Marshal von Mackensen, and early in December Serbia was crushed. King Peter and his officials fled, and the Serbian government was set up in Corfu. Albania and Montenegro were brought under control of the Central powers early in 1916, and were held by them until November, 1918.

Situation in Greece. The king and queen of Greece, the latter a sister of the kaiser, maintained a pro-German attitude in the war, while the majority in Parliament, under the leadership of Premier Venizelos, wished to join the entente. Greece was bound by treaty to go to the assistance of Serbia in case the latter were attacked, but King Constantine interpreted this treaty to refer to a Balkan, not a general European, conflict. Accordingly, Greece remained neutral for the time being. In December, 1915, however, after being defeated by the Bulgars on the Vardar River, the allies occupied the city of Saloniki, and made it impregnable, as they interpreted the position of Greece as one of "benevolent neutrality." Venizelos and the allied sympathizers approved of this attitude; the king and his followers protested against the "violation of Greek neutrality."

War Declarations of 1915. The entrance of Italy into the war, as an ally of the entente powers, in May, 1915, was the greatest diplomatic triumph of the year for Great Britain, France and Russia. The war declarations of the year are as follows:

Italy, on Austria-Hungary	May 23
San Marino, on Austria-Hungary	June 2
Bulgaria, on Serbia	Oct. 13
Great Britain, on Bulgaria	Oct. 15
France, on Bulgaria	Oct. 16
Russia, on Bulgaria	Oct. 19
Italy, on Bulgaria	Oct. 19

Italy in the War. Italy had helped save France early in the war by announcing its neutrality. Spared the necessity of guarding the Franco-Italian frontier, the French had been able to concentrate enough forces on the Marne to check the Germans in September, 1914. Germany and Austria, however, spared no pains to conciliate Italy, and entered into lengthy negotiations with Rome to keep the Italians from joining the allies. In this they were unsuccessful, and Italy declared war on Austria on May 23, 1915. There were three forces back of this decision: traditional hostility toward Austria; a popular "irredentist" movement, aiming at the liberation of those Austrian districts inhabited by Italians; a sentiment against Austro-German imperialism and militarism, which was threatening civilization and democracy. The Italians were able to put a finely-trained army into the field at once, which began an invasion of Austria and gained some initial successes. Trent and Trieste were the objective points. By the end of 1915 Italian troops had made a good beginning, but were still far from their goal.

Events of 1916. The entente gained two new allies in 1916, Portugal and Rumania. During the year there were major offensives by the Russians, Anglo-French forces and Italians, a successful defense at Verdun, a great battle between the German and English fleets off Jutland, and an extension of German submarine warfare. Other events are noted below.

The New Belligerents. War declarations of 1916 were as follows:

Germany, on Portugal	Mar. 8
Austria-Hungary, on Portugal	Mar. 15
Italy, on Germany	Aug. 27
Rumania, on Austria	Aug. 27
Germany, on Rumania	Aug. 28

Portugal, whose treaty with Great Britain bound it to furnish its ally with 10,000 troops when they were needed, was not asked to take any decisive action until February, 1916, when Sir Edward Grey requested the Portuguese government to take over all German and Austrian merchant vessels interned in Portuguese waters. On Portugal's compliance with

this request the two central powers declared war against Portugal in March. Forty merchant ships were acquired by the entente through this move. Later Portuguese troops engaged in severe fighting on the western front. Rumania declared war on Austria in August, 1916, in the hope of liberating from Austrian rule the provinces of Bukovina and Transylvania, inhabited by large numbers of Rumanians.

The Struggle for Verdun. One of the most desperate campaigns of the war began on February 21, 1916, when a German army under the command of Crown Prince Frederick Wilhelm began an attack on the fortifications of Verdun, a strongly-fortified city commanding the heights of the Meuse. The Germans hoped by a spectacular victory at this point to discourage the French, quiet political discontent at home, and relieve the French threat at the rich iron mines north-east of Verdun and in German Lorraine. If the French held on the Meuse heights could be *recaptured, their army would never be able to conquer Alsace-Lorraine*, and the morale of the soldiers would suffer a severe blow. The great drive carried the German troops through the outlying defenses of the fortress, but after months of desperate fighting the French, commanded by General Pétain, were still holding the heart of the salient, and all resolute, indomitable France was ringing with the battle cry of the soldiers, "They shall not pass!"

From February to July the Germans gained 130 square miles of territory, including two battered forts and about forty ruined villages. Then for several weeks there was a lull in the fighting, while the French were making preparations for a counterstroke. It came in October, when General Nivelle, who had superseded Pétain, began an offensive on the east bank of the Meuse, north of the town. In the first onrush Douaumont village and fort, Thiaumont farm and redoubt and Haumont quarries were recaptured. Other successes followed, and in December a renewal of the offensive brought about the recapture of several other strategic points. Though it took another year of fighting to bring the French lines near to their original position, the failure of the German stroke and the success of the French counter-attack made the battle an allied victory at the end of 1916. Losses on both sides were heavy, with the Germans suffering the more severely.

Battles of the Somme. A military conference of the allies was held in Paris in March, 1916, at which a plan for concerted action was perfected. Hitherto disconnected attacks on the various fronts had given the central powers the advantage because the excellent railway system of Germany enabled large bodies of troops to be moved quickly from one front to another as they were needed. A large British army under the command of Sir Douglas Haig was mobilized in France along the Somme, while the German Crown Prince was carrying on his campaign against Verdun.

In the last days of June the British, French and Belgians began a systematic bombardment of the German defenses that extended from Verdun all the way to the North Sea. This bombardment was especially violent along the section north and south of the Somme, where the British were opposite the German lines. The heavy artillery of the British and French demolished the works of the enemy in this section, and on July 1 the forward movement began. The allies captured all the German first line trenches over a front of twenty-five miles. Within fifteen days fifteen villages and about 25,000 prisoners were taken.

After the first impetus of the drive had spent itself there was a period of quiet with both sides preparing for the next phase of the battle. On September 3 the Anglo-French forces struck again, the British at this time making use of a new war device, the armored tank. When the battle died down, in November, the allies had recaptured about 120 square miles of territory. The Germans are estimated to have lost 700,000 in killed, wounded and prisoners, the allies, 675,000. General Haig asserted the battle was an allied victory because it had relieved the pressure on Verdun, kept the Germans from withdrawing forces to the east against Russia (see below) and served to diminish the German manpower.

The Second Russian Offensive. Russia devoted its energy during the first months of 1916 to increasing and training its armies, and supplying them with arms and ammunition. There were several engagements on the southern part of the line held by the Russians before June, and on the third of that month the Russian forces under General Brusiloff began an extensive forward movement which swept the country from the

Pripet River on the north to Rumania on the south. The crownland of Bukowina was occupied, Lemberg, in Galicia, was threatened, and the advance column of the invaders reached the Carpathian Mountains. Several important towns fell into the hands of the Russians, and they took a large number of prisoners. The drive had spent itself by August, but it helped the French, British and Italians by keeping the Central Powers busy on both the east and the west fronts. Russia lost hundreds and thousands of its best troops in the fighting of 1914-1916, and was being menaced from within by corrupt officials and traitors. The sequel to this was the betrayal of Rumania, which entered the war on August 27 (see below).

Italian Reverses and Victories. In May the Austrians began an offensive against Italy for the purpose of disrupting allied plans for a summer campaign, and in the hope of putting the Italians out of the war by a conquest of Northern Italy. After a month of strenuous fighting the Austrians recovered 270 square miles of their own territory and conquered 230 square miles of Italian soil. The Italians lost heavily in men and material, but they offered strong resistance and definitely checked the offensive, besides inflicting heavy losses on the enemy. Russia's attack on Galicia and Bukowina, which forced Austria to withdraw troops from the Italian front, was a great factor in saving Italy from further invasion.

Two weeks after Russia launched the Austrian campaign, General Cadorna, commander of the Italians, began a vigorous counter-offensive with a new army of 500,000 men. During the last week of June the Austrians began to retreat on the Trentino front, where the Italian offensive proceeded vigorously throughout July. On August 4, five weeks after the Anglo-French attack on the Somme, Cadorna opened a vigorous attack along the Isonzo front, with the city of Goritz as the objective point. This place was protected by hills and mountains bristling with guns, but the Italians carried everything before them in their impetuous onslaught, and on August 9 triumphantly entered the city with King Victor Emmanuel at their head. The tide of battle then turned southward to the Carso plateau, which lay a strong barrier between the Italian army and the coveted city of Trieste. Here progress was made only at the expenditure of well-nigh superhuman efforts.

The Tragedy of Rumania. The Rumanians began an invasion of Transylvania (in Hungary) immediately after the declaration of war against Austria-Hungary. During September they conquered about one-fourth of Transylvania and captured nearly 7,000 prisoners. The Rumanian staff confidently expected that General Sarrail, the allied commander in Macedonia, would keep the Bulgarians from attacking, and that Russia would take care of the Austro-German forces on the Russian front. Rumania itself was left unprotected, a rash proceeding that brought about a speedy collapse of the new ally.

On September 2 a Bulgarian force invaded the Rumanian Dobruja. Subsequently, the Germans under General von Falkenhayn trapped the Rumanian forces in the mountains of Transylvania, and invaded Rumania itself, and Field Marshal von Mackensen on December 6, after a series of brilliant victories, entered the city of Bucharest. The net results of the fighting from November 15 to December 6 were the rout of the Rumanian army, the capture of 80,000 prisoners and the conquest of the greater part of Wallachia (Southern Rumania). Lines of communication with Constantinople were opened, and large stores of supplies fell into the hands of the Central Powers, giving them additional means for carrying on the conflict.

It was subsequently revealed that chief blame for Rumania's plight must be placed on several of Russia's government officials, notably Premier Sturmer, a reactionary and a Pro-German. He had been instrumental in persuading Rumania to come into the war at a time when Germany could best cope with the situation, and had kept back promised Russian troops from Rumania when Bulgaria took the offensive and when Von Mackensen attacked. Through his intrigues needed supplies had been withheld when the Rumanians were sending desperate pleas for help, and before any operations began Rumania's plans were in the hands of the German officials. For these and other crimes Sturmer was indicted at the time of the Russian revolution, he was placed in prison, where he died, in September, 1917.

The War in Asia. In January, 1916, a Russian army under Grand Duke Nicholas invaded Turkish Armenia, drove back the Turkish forces in disorder, and on February 16 entered the fortified city of Erzerum, capturing over 320 guns and a great store of

supplies. In the spring Trebizond was captured, and in July the city of Erzerum, an important strategic center, 110 miles west of Erzerum, was taken. Elsewhere in Western Asia, however, the struggle did not go so well with the allies. General Townshend's British forces, besieged in Kut-el-Amara (see above), were starved into submission and surrendered on April 28, 1916. The force was diminished by fighting and hardship to fewer than 9,000 men, and the expedition was regarded by the English as a grave mistake. Russian expeditions against the Bagdad Railway also failed.

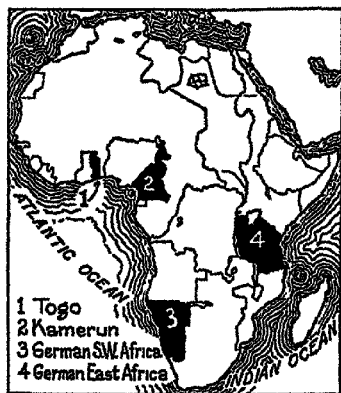
Allied Victories in Africa. At the beginning of 1916 only two colonies remained to Germany, Kamerun and German East Africa. Kamerun was completely overrun by Belgian,

however, did great damage to allied shipping before they were destroyed. Among these were the *Emden* and the *Königsberg*. The former cruised the Indian and the South Pacific oceans for three months, but were finally destroyed near Java by an Australian cruiser, on November 9, 1914. The *Königsberg* also had a successful career before its destruction on the coast of German East Africa.

The German Far East Squadron of five powerful cruisers, after defeating a smaller British fleet in November, off the coast of Chile, was itself defeated on December 8 off the Falkland Islands. Another important engagement occurred on August 28, in the night of Helgoland, when a British fleet, accompanied by torpedo-boat destroyers, was led into action by Sir David Beatty. Three German armored cruisers and two destroyers were sunk. German raiders at various times bombarded English coast towns, and were somewhat successful in eluding the vigilance of British warships. On the other hand, Germany's hope of weakening England by striking terror into the hearts of the civilian population of these towns was quite unsuccessful.

The allies lost a good many ships through mines as the war continued, and a few German cruisers were still menacing allied shipping when a new form of naval warfare, the submarine, began to threaten the allies. In February, 1915, Germany announced that its submarines would destroy any merchant vessels venturing into the waters surrounding Great Britain and Ireland. Great Britain retaliated by declaring a virtual blockade of all Germany, and from that time on the submarine and the blockade engaged in a desperate fight to the finish. The importance of Germany's decision to use the underseas boat against merchant vessels was not at that time fully realized. It was destined to have far-reaching effects, in fact, it brought about Germany's downfall.

On May 31, 1916, occurred the only battle of the war in which the main fleets of Germany and England participated. It was fought in an arm of the North Sea—the Skagerrak—about fifty miles off Jutland. The British fleet was in command of Sir John Jellicoe but the division which bore the brunt of the battle was commanded by Vice-Admiral Beatty. The German fleet consisted of five battle cruisers, seventeen dreadnoughts,



AFRICAN COLONIES LOST BY GERMANY

British and French troops in January, and in February a powerful Boer army from South Africa, under the command of Jan Christian Smuts, invaded German East Africa. This army, in cooperation with British and Belgian troops, had conquered the greater part of the colony by the close of the year.

The War on the Sea. Early in the war German commerce was driven from the seas, British naval supremacy having saved the situation for the allies. The main German fleets did not attempt to dispute this supremacy, but remained at their bases at Kiel and Wilhelmshaven, protected by great fields of submarine mines and the strong fortifications of Helgoland. Several German cruisers,

eight predreadnoughts and several fast light cruisers and destroyer flotillas. In the British fleet there were six battle cruisers, four fast battleships, several fast light cruisers and destroyers, and twenty-five dreadnoughts. The Germans claimed that their high-seas fleet was cruising about in the hope that it might meet and give battle to the British fleet. The latter was on one of its periodical cruises in the North Sea.

In the afternoon, Vice-Admiral Beatty, who was in advance of the main force of the grand fleet, became aware of the presence of the Germans, and after maneuvering for position, opened fire simultaneously with the enemy. The battle lasted well into the night, without decisive results at the time. Losses on both sides were heavy, with the British suffering the more severely in number of ships destroyed. They admitted the loss of fourteen vessels and 5,613 men, the Germans, eleven ships and 3,966 men. However, the German ships retired to their base and the main fleet did not venture out again during the war. It was afterwards disclosed by a German naval authority that misty weather and skilful seamanship alone saved the German fleet from overwhelming defeat, and that the battle convinced the German command that it was impossible to wrest from the British their control of the sea through battles of this nature. From that standpoint the British won a victory, though they suffered heavier losses than their enemy.

Effects of Submarine Warfare. Once the German submarine warfare was launched, complications with neutral nations developed. In May, 1915, the Cunard liner *Lusitania* was torpedoed without warning off the coast of Ireland, while on its voyage from New York to Liverpool. About 1,150 persons lost their lives, including 114 Americans. The Germans considered this a justifiable act of reprisal because of the blockade, which was keeping food and other necessities out of Germany, but it was generally regarded as a violation of international law and of the laws of humanity, and aroused feelings of horror throughout the civilized world.

Of the neutral nations, the United States was the most powerful and the one whose good will was most needed by the belligerents. The sinking of the *Lusitania* brought to a climax certain diplomatic correspondence which had been passing between the United States and Germany since the an-

nouncement of the submarine campaign, and was the occasion of a series of notes from President Wilson in which he insisted on Germany's respecting the rights of neutrals on the seas. Other sinkings followed, however, and though the President apparently secured from Germany a promise to abstain from torpedoing merchant vessels without warning, unrestricted submarine warfare was announced as a deliberate policy early in 1917 (see below). The heavy losses inflicted on allied shipping by the submarines put naval experts on their mettle, and a vigorous anti-submarine campaign caused the destruction or capture of large numbers of undersea boats.

Events of 1917. The allies suffered a tremendous blow in 1917 in the collapse of Russia, but this was offset by a great diplomatic triumph, the entrance of the United States into the war. America's action profoundly impressed the Central and South American nations, many of which declared war on Germany or broke off diplomatic relations. Siam and China, in Asia, and Liberia, in Africa, also associated themselves with the allies, as did Greece, in Europe. The ever-widening circle of German opponents showed the extent of the feeling against submarine warfare and the ruthlessness of German warfare on land. Heartrending stories of the treatment of conquered peoples and reports of Turkish massacres of Armenians and Syrians added fuel to the flames of resentment that seemed to sweep around the world. Notwithstanding the powerful coalition against the Central Powers, their armies held their own in the fateful year of 1917, and they nearly put Italy out of the war. War declarations of the year were as follows:

United States, on Germany	Apr. 6
Cuba, on Germany	Apr. 8
Panama, on Germany	Apr. 9
Greece, on Germany	July 22
Siam, on Germany	July 22
Liberia, on Germany	Aug. 7
China, on Germany	Aug. 14
Brazil, on Germany	Oct. 26
United States, on Austria-Hungary	Dec. 7
Panama, on Austria-Hungary	Dec. 10

The following nations severed diplomatic relations with Germany:

Bolivia	Honduras
Costa Rica	Nicaragua
Ecuador	Peru
Guatemala	Santo Domingo
Haiti	Uruguay

Military Events in the West *British and French Drives* In January, 1917, after a period of intensive preparation, the British renewed the battle on the Somme front, gradually pushed the German line back, and by March 13 had come within artillery range of Bapaume, one of the main objectives of the Somme campaign. About this time indications pointed toward an extensive withdrawal of the German forces to a strong defensive position which came to be known as the "Hindenburg line." By March 15 the retreat was well under way, and General Haig thereupon ordered a general advance along the entire front from Arras to Roye. At the same time the French began an advance from Roye to Rheims. Stiff fighting ensued for several days, the Germans counter-attacking at intervals, but steadily moving back before the violent onslaughts of British and French. Something like 1,000 square miles of desolated territory were redeemed by the German withdrawal.

On April 9 a new offensive on a gigantic scale was begun, with the British striking for Lens, the center of the coal district, and for Saint Quentin. Among the spectacular feats of this drive was the capture of Vimy Ridge by the interpid Canadians. This ridge was the key position to Lens, which was thus placed in a dangerous "pocket." The British pushed their way to within a few hundred yards of Saint Quentin, but failed to take the city. By June the battle had become a deadlock, but the British had achieved one of their chief aims, the wearing down of German man-power and material. In counter-attacks during the Battle of Arras the Germans suffered very heavy losses.

Interest in the progress of the war was shifted to Belgium in June, where the British line at Ypres needed attention. It was in the form of a huge S written backwards, Ypres occupying the upper curve. In the lower curve was Messines Ridge, which was held by the Germans. If the Ypres salient were wrested from the allies the way to Calais would be opened to the Germans, and the precarious condition of the British line was a source of great anxiety. For over fifteen months preparations to capture the ridge were under way. Under the heights a series of mines ten miles in extent was placed, and these were exploded on June 7 by electric contact. The blast blew off the top of the hills and destroyed scores of

trenches and dugouts, while the artillery played on the exposed positions with unparalleled violence. English, Irish, Australian and New Zealand infantrymen then swept forward, capturing the entire ridge and assailing the German positions in the rear. When this phase of the battle ended the British had captured defenses on a front five miles wide and three deep, straightened their line, taken 7,000 prisoners and removed the threat to Calais.

Meanwhile, on April 16, the French, under General Pétain, began an assault on the Aisne River, between Souissons and Rheims. Fighting continued at intervals until November, when the French held positions dominating the Aisne and Ailette valleys, including the celebrated Chemin des Dames (Road of the Ladies), capture of which was one of the great French exploits of the war. Forty square miles of territory were liberated, and 12,000 prisoners taken, besides immense quantities of war material.

Fighting in Belgian Flanders was renewed by the British in July and continued to the end of the year. They hoped to drive the Germans from the Belgian coast, to force them to abandon their submarine bases at Ostend and Zeebrugge, and to encircle the important industrial city of Lille. The ultimate objects of the campaign were not realized, but the new positions gained held out promise of better success for the 1918 campaign. Late in November the French battleground came again into prominence when General Byng made a spectacular attack in the direction of Cambrai, and at heavy cost approached within two miles of that German-held city. However, by a quick counter-stroke Hindenburg's armies pushed their foe back two miles, and the effect of Byng's dash was nullified.

The Collapse of Russia In spite of disorganization and political upheaval in Russian official circles, a Russian army began an offensive in Baltic Russia, in January, with the capture of Mitau, capital of Courland, the chief objective. The movement was a failure, and in March the long threatening revolution broke out in Petrograd. The czar was forced to abdicate, and a democratic provisional government was set up.

The revolutionists declared their loyalty to the allied cause, but were unable to hold their armies together as a fighting machine. German propaganda further weakened the

morale of Russia's troops, and it was soon evident that whatever turn the revolution took the country was practically out of the war and could not longer be counted on for support, even to the extent of continuing to menace Germany and keeping German regiments on the eastern front. Under Kerensky as Premier an attempt was made to establish a republic on a moderate Socialist basis, but the radical elements rapidly organized, and in November, headed by Lenin and Trotzky, they overturned the Kerensky régime. These radicals were known as the *Bolsheviks*, meaning *those of the majority* (for further details see RUSSIA and the article *BOLSHEVIKI*).

The Bolsheviks promised the people bread and peace, and immediately set about negotiating a treaty with the Central Powers which should put Russia out of the war. The peace envoys met at Brest-Litovsk, German eastern headquarters, once an important city in Western Russia, but since 1915 in ruins.

Perhaps never before had the world witnessed so one-sided a peace conference between nations which did not meet as victor and vanquished. Germany, through a legislative majority, had proclaimed its desire for peace without annexations or indemnities. At the conference, however, the German military leaders declared that Russia could not include German-occupied territory in peace discussions. This was a vital point in the negotiations, for during the summer and fall, while Russia was in political and industrial chaos, German armies had taken Riga and the provinces of Esthonia, Livonia and Courland, and had gained triumphs in the south where the Ukraine had declared for self-government.

Trotzky, in charge of the Russian peace delegation, unable to change the German purpose, withdrew his fellow members from Brest-Litovsk, declaring he would make no peace, yet would not continue the war. Subsequently, Lenin signed a humiliating peace, which deprived Russia of all occupied territory (for details, see RUSSIA). Even after the agreement was signed German armies continued to push farther into Russia, and Petrograd was threatened. The Bolshevik government thereupon moved to Moscow.

Rumania Crushed. At the close of 1916 Southern Rumania (Wallachia) was in the possession of the Central Powers, but the northern district, Moldavia, was not yet

subdued. In December the Tentative forces began an offensive to complete their conquest of the country, and by the middle of February, 1917, they had under control all but a few sections in the north. The withdrawal of Russia from the war, later in the year, forced Rumania to make a reluctant peace. In March, 1918, the humiliating Treaty of Bucharest was signed, by which Rumania was forced to cede the Dobruja as far as the Danube River to the Central Powers, and to grant economic advantages, such as the control of railways, wheat harvests and oil wells, for an indefinite period. The treaty made the country practically a vassal state of Germany.

Italy's Disaster. The account of the Italian campaign on a preceding page stated that the armies of Victor Emmanuel captured Gorizia in August, 1916. In the spring and summer of 1917 they continued their attacks, winning brilliant victories and approaching to within ten miles of Trieste. Then in the fall of 1917, when the allies were feeling the effects of the Russian collapse, they were disheartened by news of disaster from the Italian front.

After a campaign of subtle propaganda, during which Germany led several Italian divisions to believe peace to be near, Austro-Hungarian troops with the aid of strong German forces opened an offensive (October 21). Not only did Italy lose the ground that had been won the year before, but its enemy penetrated Italy itself and was not stopped until the Piave River was reached. About 1,000 square miles of Italian territory were thus laid under German domination. Venice was threatened; its works of art were removed, its wonderful buildings protected as much as possible, and the inhabitants sent farther south. Had not the lowlands around the mouth of the Piave been flooded to arrest the progress of the enemy, the city might have been attacked successfully.

Allied Victories in Asia. Though allied prospects were dimmed by the Russian, Rumanian and Italian disasters, the year 1917 was favorable for them in Asia. Early in the year the British began a campaign in Mesopotamia to offset the unsuccessful expedition of General Townshend. Under General Sir Stanley Maude British troops worked their way up the Tigris, forced the Turks to abandon Kut-al-Amara (February) and in March triumphantly entered the city

of Bagdad. The evacuation of the historic city was a blow to Turkish prestige, and with its fall the valuable cultivated fields of Babylonia came into British control. By fall the British had advanced a hundred miles north of Bagdad and had secured control of the Bagdad-Sumara railway. In November they suffered a disaster in the death of General Maude.

Palestine was also the scene of allied victories. Early in February, 1917, the British under General Sir Edmund Allenby captured Rafa, on the Sinai Peninsula, and began an advance on Gaza and Beersheba. Not until autumn were these towns captured, but after the fall of Gaza, in November, progress was rapid. On December 10 Jerusalem was captured, and the Holy City was in Christian hands for the first time in four centuries.

Greece. Grecian neutrality was abandoned in June, 1917, when the king abdicated, and the pro-ally statesman Venizelos formed a new Ministry. King Constantine was succeeded by his second son, Alexander, as the crown prince was suspected of pro-German tendencies. In this diplomatic upheaval the entente had an active part. The allied army in Macedonia was now in a position to advance, as there was no longer danger of an attack in the rear on the part of Constantine.

The United States Enters the War. Throughout the year of 1916 President Wilson had been seeking by diplomatic correspondence to persuade Germany to modify its submarine warfare, which the President held was in direct violation of international law. What he sought in particular was Germany's promise that merchant and passenger vessels should not be attacked without warning. The Germanic allies were the only belligerents causing the death of noncombatants on the high seas, and feeling in the United States was stirred to a high pitch when sinkings continued in spite of apparent yielding to the President's demand. Then, early in 1917, came a crisis.

On January 31 Count von Bernstorff, the German ambassador at Washington, delivered a note to the State Department announcing the inauguration of unrestricted submarine warfare on the first day of February. The note stated that from that date all neutral and enemy vessels encountered anywhere on the seas would be sunk without warning, but

that the United States would be permitted weekly to send one ship in each direction across the Atlantic, if it were properly marked for identification and followed a designated course. Germany thus renounced a former promise to America to respect the rights of nations upon the high seas.

President Wilson thereupon severed diplomatic relations with Germany, and on February 3 Bernstorff was handed his passport. The two nations were not officially at war until April 6, but in the meantime the United States became an armed belligerent. On February 26 President Wilson asked Congress for authority to arm American merchant vessels. The House passed a bill granting such authority, but a filibuster in the Senate by a small group of opposition Senators prevented its passage before the expiration of the session of Congress, on March 4. The President, however, found authority for arming ships in an old act of 1819, and so nullified the efforts of the opposition.

On March 12 the policy of armed neutrality was announced. Meanwhile the country had been stirred to increased indignation by the publication of a note from the German Foreign Minister to the German ambassador in Mexico, directing the latter to propose an alliance with Mexico against the United States should America and Germany become enemies. A similar suggestion to Japan was proposed.

The policy of arming merchant vessels did not meet the situation, and sinkings continued. A large section of the population and press felt that actual participation in the war was the only honorable course, a feeling shared by the President, who called the Sixty-fifth Congress in special session on April 2. Before a joint assembly of both houses he read an eloquent war message in which he asked that Congress recognize a state of war between the United States and Germany. On April 4 the war resolution passed the Senate by a vote of 86 to 6, and on April 6 it passed the House by a vote of 373 to 50. The resolution was worded as follows:

Whereas, the Imperial German Government has committed repeated acts of war against the Government and the people of the United States of America. Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled

That the state of war between the United States and the Imperial German Government which has thus been thrust upon the United States is hereby formally declared, and that the President be, and he is thereby, authorized and directed to employ the naval and military forces of the United States and the resources of the Government to carry on war against the Imperial German Government, and to bring the conflict to a successful termination all of the resources of the country are hereby pledged by the Congress of the United States

Chronological Survey of Events. The following is a list of events showing the relation of the United States to the war from its outbreak in 1914 to the war resolution of 1917. It shows that there were numerous hostile acts on the part of Germany and its agents from an early date.

1914

- Aug 3—Congress appropriates \$250,000 for emergency relief of Americans in Europe
- Aug 4—America issues proclamation of neutrality
- Aug 5—President Wilson offers to mediate between belligerent nations, appeals for peace
- Aug 5—German-American cable cut.
- Aug 14—German kaiser tells United States Ambassador Gerard that he is unable to accept president's offer of mediation, says neutrality of Belgium had to be violated on strategical grounds
- Aug 15—Congress appropriates \$2,500,000 for use of American diplomatic and consular officers abroad to relieve American citizens
- Aug 16—United States cruisers Tennessee and North Carolina arrive at Falmouth, England, with money for relief of stranded Americans
- Aug 18—President Wilson appeals to citizens of United States to observe strict neutrality towards all belligerents
- Aug 26—Belgium protests to the United States against throwing of bombs from German aircraft on Antwerp
- Sept 11—Congress appropriates \$1,000,000 for expenses of American embassies and legations abroad representing various belligerents
- Sept 18—Mission from Belgium appeals to President Wilson against alleged atrocities committed by Germans
- Oct. 12—American emergency war tax—Increase in internal revenue tax—becomes a law
- Nov 1—Rockefeller Foundation announces that it will help Belgium relief work
- Nov 16—United States launch from cruiser Tennessee fired upon by Turks at Smyrna.
- Nov 26—Allies ask United States to help enforce neutrality of Ecuador and Colombia against German intrigue
- Dec. 24—Admiral von Tirpitz, chief of German navy, outlines possibilities of ruthless submarine war and asks: "What will America say?"

1915

- Jan 14—Buchthorne plant of John A. Reebing, Trenton, N J, engaged in work for allies, burns, loss \$1,500,000 Incendiarism suspected
- Jan 28—German auxiliary cruiser Prinz Eitel Friedrich sinks American ship William F Frye and brings its crew to American port.
- Feb 2—Attempt to blow up international railroad bridges between Vanceboro, Me, and New Brunswick, Canada, confessed by Werner Horn, German captain
- Feb 4—Germany proclaims waters surrounding Great Britain and Ireland to be war zone and says that on and after Feb 18 "every enemy merchant ship found in said zone will be destroyed, it not always being possible to avert dangers that threaten crews and passengers. Even neutral ships are exposed to danger in war zone, as in view of misuse of neutral flags ordered Jan 31 by British government, and of accidents of naval war it cannot always be avoided to strike even neutral ships in attacks that are directed at enemy ships"
- Feb 10—United States replies to German proclamation, warning Germany the destruction of American vessels or loss of American life is an indefensible violation of neutral rights and that the United States will hold Germany to strict accountability for all such acts
- Feb 18—Germany protests to the United States against British blockade, justifies its submarine campaign on ground of "starvation methods" of allies, says it is not the intention of Germany to destroy neutral lives and neutral property
- Feb 19—American freight ship Evelyn, carrying cotton from New York to Bremen, strikes mine in North sea, one life lost.
- Feb 19—Great Britain explains that American flag was raised on liner Lusitania at request of American passengers and that this practice has been recognized heretofore as permissible in an emergency
- Feb 20—United States sends identical notes to Great Britain and Germany asking that neutral vessels be not endangered, that no floating mines be turned loose, that no anchored mines be placed in high seas, that submarines be not used to attack merchantmen, that no neutral flag be used on belligerent ships, that the nations agree that United States send foodstuffs to American agents in Germany for distribution to non-combatants
- Feb 22—American ship Carib sunk at mouth of Elms river, Germany
- March 1—Germany replies that it would be willing not to use floating mines, refuses to give up anchored mines, sets forth submarine is not to attack merchant ships except to visit and search, sets forth enemy is not to use neutral flag nor to arm its merchantmen; demands that raw material be passed in addition to foodstuffs, the plan for the distribution of which it says "is generally acceptable"

March 1—France and Great Britain announce that in view of indiscriminate sinking of ships by Germany, allies will hold, detain and take into port ships carrying goods of presumed enemy origin, destination and ownership

March 2—Congress creates coast guard and naval reserve

March 6—Five men killed in two explosions in Du Pont powder plant at Haskell, N H, manufacturing for allies

March 8—Charles Ruroede pleads guilty in New York to obtaining false passports for German reservists

March 15—Great Britain replies to American note of Feb 20 that it cannot consider acting on it since Germany will not abandon mine laying or submarine warfare. It protests against German acts affecting civilians in Belgium and northern France, mine laying on high seas, mistreatment of British prisoners of war, sinking of British merchantmen, bombardment of defenseless towns, and air raids

March 27—American merchantman Falaba, 3,011 tons sunk by submarine, one American life lost

March 30—United States issues protest against interference with its trade

March 31—The United States presents to Germany a claim for \$23,059 for sinking of the William P Frye

April 1—Five men killed in explosion in plant of Equitable Powder company, Alton, Ill

April 2—American ship Greenbrier sunk by a mine immediately after leaving Bremen for New York

April 4—Germany protests that food shipments are not reaching her, since American war materials can reach only one group of belligerents she suggests an embargo on all war shipments

April 5—Germany offers to put the case of the William P Frye up to prize court, to which the United States objects

April 21—United States replies to German protest against sending munitions that it would not be neutral if it abandoned trade

April 22—German embassy at Washington publishes warning in New York newspapers against passengers sailing on Lusitania

April 23—American oil tank steamer Cushing bound from Rotterdam to Philadelphia attacked near Antwerp by German aeroplane, which throws three bombs

May 1—American oil tank steamer Gulfight torpedoed by German submarine without warning off Scilly islands, three Americans dead

May 7—Cunard liner Lusitania, from New York to Liverpool, torpedoed off Irish coast by German submarine without warning, 114 American lives lost

May 12—Guncotton storehouse of Anderson Chemical company, Wallington, N J, wrecked by explosion, three dead

May 13—United States sends first protest to Germany on sinking of Lusitania as not compatible with international law

May 25—American ship Nebraskan, chartered to British White Star Line, carrying coal for United States navy, damaged by a German submarine near Ireland

May 28—Germany defends sinking of Lusitania, asserting that it carried munitions and traveled too fast to be warned

June 2—United States again asks Germany, in second Lusitania note, for assurances that American lives and property will be safeguarded in future

June 12—Bernhard Dernburg, German propaganda leader in America, who justified sinking of Lusitania in newspaper interview, departs for Germany via Norway because of his unpopularity

June 23—British mule ship Armenian sunk by German submarine, twenty Americans dead

June 29—Austria protests to the United States against shipment of munitions to allies, admits America's legal right, but insists action is not neutral, because part of belligerents are out off from supply

July 2—Frank Holt (Erich Muentzer) tries to blow up capitol at Washington as protest against making munitions, next day tries to kill J P Morgan, commits suicide in jail, July 6

July 7—Incendiary fire discovered in hold of transatlantic steamer Minnehaha

July 8—Germany promises that American ships in the prosecution of legal voyages will not be hindered, American lives on neutral vessels shall not be placed in jeopardy

July 9—Cunard line steamship Orduna, carrying Americans, attacked off Irish coast by submarine with torpedo and shells without warning, uninjured

July 12—Germany declares attack on steamer Nebraskan was due to misunderstanding, expresses regret and promises compensation

July 13—Public disclosures prove attempts by German sympathizers in United States to destroy by bombs the following transatlantic vessels Bankdale, Touraine, Devon City, Lord Erne, Cressington, Samland, Lord Devonshire, Kirkoswald and Strathay

July 13—Mixing building of United Safety Powder company at Jefferson, Ky, wrecked, three killed

July 21—United States, in third Lusitania note, asks Germany to make reparation for lives lost and disavow act, declares that such another attack will be considered deliberately unfriendly

July 25—American ship Leelanaw, from Archangel to Belfast, loaded with flax, torpedoed off the Orkneys

July 31—British steamer Iberian, 5,223 tons, sunk, three Americans killed by shell fire, three wounded

Aug 12—United States replies to Austria-Hungary that it is not violating neutrality in making munitions

Aug 16—Five killed in explosion of Sinnamahoning (Pa) plant of Ethna Explosives company

Aug 19—White Star liner Arabic, 15,801 tons, torpedoed, two Americans killed

Aug 24—German Ambassador Bernstorff gives out interview in Washington saying loss of American lives on Arabic was "contrary to our intention"

Aug 28—Two Du Pont powder mills at Wilmington, Del., destroyed, two killed

Aug 30—Shrapnel plant of E J Dodd company, Baltimore, Md., burned

Aug 30—Through discovery of letters carried by James J F Archibald and seized by English at Falmouth, United States learns that Dr Constantine T Dumba, ambassador of Austria-Hungary to United States, writes his superiors that he has plans under way to "disorganize and hold up for months, if not entirely prevent, manufacture of munitions in Bethlehem, Pa, and middle west, which, in opinion of German attache, is of great importance and amply outweighs expenditure of money involved" Other disclosures also made

Sept 1—Germany promises that "liners will not be sunk by our submarines without warning and without safety to lives of noncombatants, provided that liners do not try to escape or offer resistance"

Sept. 4—Steamship Esaperian, 6,124 tons, torpedoed one American killed

Sept 5—President Wilson asks recall of Dr Dumba, Austro-Hungarian ambassador, on ground of Archibald disclosures

Sept. 19—Germany, after negotiation in case of the William F Frie, agrees that amount of damage shall be settled by conference of experts and says submarines have been ordered not to destroy American merchantmen carrying conditional contraband

Sept 21—British house of commons makes public thirty-four letters and documents found on Archibald, two from German attache Boy-Ed, and one from Von Papen, German captain

Sept. 24—Austria-Hungary reiterates protests against America's making of munitions

Oct. 12—Edith Cavell, English nurse, executed at Brussels in spite of protest of American legation

Oct 24—United States secret service men arrest Robert Fay, lieutenant in German army, and others in New York on charge of conspiring to destroy munitions' ships by bombs, Fay, Walter Schoels and Paul Daech found guilty May 8, 1918

Nov 7—Ancona, 8,210 tons, sunk by Austrian submarine, twenty-four Americans killed

Nov 10—Machine shop of Bethlehem Steel company, South Bethlehem, Pa., burned with loss of \$5,000,000

Dec 2—United States asks Germany to recall Capt. Boy-Ed, military attache, and Capt Von Papen for "improper activities in military and naval matters" Boy-Ed said to have handled \$750,000 for chartering ships to supply German raiders

Dec 2—United States steamer Communiapaw sunk

Dec 4—Karl Bueck, Adolf Hochmeister, George Koetter and Joseph Poppinghaus of

the Hamburg-American line convicted of conspiracy to deceive and defraud the United States by supplying German cruisers at sea

Dec 5—American oil tank ship Petrolite attacked

Dec 6—United States sends Austria note of protest against sinking of Ancona

Dec 7—President Wilson advocates preparedness in message to congress

Dec 30—British liner Persia sunk by submarine, Robert N McNeely, newly appointed consul of United States at Aden, Arabia, killed, also Homer R Salisbury, American missionary.

1916

Jan 5—Brindisi, Italian steamship, strikes mine, one American killed

Jan 7—Germany in official note promises submarine shall insure safety of crews and passengers, if accident prevents this, will make reparation, offers to pay indemnity for Americans lost on Lusitania

Jan 27—President Wilson begins speaking tour through country to advocate large volunteer army with reserve of 500,000

Feb 10—Austria and Germany announce to United States that after Feb 29 they will treat armed merchantmen as belligerent ships

Feb 17—Lusitania case regarded as settled, Germany agrees to warn liners, but objects to armament

Feb 24—President Wilson, in letter to Senator Stone, declares rights of Americans cannot be abridged or denied and that order to Americans to keep off armed merchantmen would be such denial

March 3—Gore resolution declaring sinking of armed merchant vessel by submarine with loss of American lives cause for war, lost in senate

March 7—House refuses to consider McLeMORE resolution to warn all American citizens against traveling in armed ships

March 9—One American injured in torpedoing of Norwegian bark Silvis by German submarine

March 16—Dutch liner Tubantia, with Americans aboard, torpedoed without warning British merchantman Berwindale, with four Americans aboard, torpedoed

March 24—French channel steamer Sussex torpedoed without warning, Americans injured British merchantman Englishman torpedoed, one American killed

March 27—United States asks Germany if her submarine sank the Sussex

March 27—British merchantman Manchester Engineer, with Americans aboard, sunk without warning by torpedo

March 28—United States asks Germany if her submarine sank the Englishman

March 29—United States asks Germany if her submarine sank Manchester Engineer

March 31—Horst von der Goitz, alleged German spy, discloses plot to invade Canada, destroy Welland canal, admits enlisting Germans in Baltimore and elsewhere

April 1—United States asks Germany if her submarine sank British steamer Eagle Point, with Americans aboard on March 28

April 1—United States asks Germany if her submarine sank British steamer Berwindale, with Americans aboard on March 18

April 11—Germany replies Berwindale tried to escape submarine, Englishman tried to escape, Manchester Engineer not established, Eagle Point tried to escape, Sussex sinking not yet traced to submarine

April 13—United States furnishes proof that German submarine sank Sussex, threatens breach of diplomatic relations if similar sinking is repeated

April 19—President Wilson goes before congress to explain details of submarine controversy and warning to break relations

April 19—Government officers in New York seize papers of Wolf von Igel, former secretary to Capt von Papen, German ambassador asks for papers on ground of diplomatic immunity, government offers to give him any that he can identify as belonging to embassy

May 4—Germany announces submarine commanders have received orders not to sink ships without warning and saving human lives, unless they offer resistance or attempt to escape

May 5—Germany in detailed statement declares all ships encountered by submarines will be dealt with according to international law, if neutral is damaged Germany will make reparation without recourse to a prize court or submit to international arbitration

May 13—New York holds first preparedness demonstration in country with 125,683 men in line

May 16—Batholier V, Dutch liner, sunk by mine, one American killed

June 3—Chicago preparedness demonstration with 136,214 men in line

June 3—Chamberlain army bill providing for volunteer army and federalized national guard, becomes law

June 13—Congress appropriates \$300,000,000 for training national guard

July 1—Act drafting national guard into regular army becomes a law

July 31—Dutch liner, Koenigin Wilhelmina, with American aboard, torpedoed

Aug 29—Act increasing navy becomes law, adds 157 ships, ten battle ships six battle cruisers, ten scout cruisers, fifty destroyers, nine fleet submarines, fifty-nine regular submarines

Sept 2—British merchantman Kelvina, with twenty-eight Americans aboard, sunk by mine or torpedo

Sept 7—Shipping board to encourage naval auxiliary formed

Sept 8—Emergency revenue act becomes law, provides for special munitions tax, etc.

Oct. 7—German war submarine U-53 puts in at Newport, R. I. on Oct. 8 it sinks Strathdene, British, West Point British, Stephano, British, Bloomersdyk Dutch, and Christian Knudsen Norwegian United States destroyers rescue survivors Ste-

phano had many Americans abroad, returning from vacation in Newfoundland

Oct. 19—Aulania, British merchantman, sunk without warning in English channel, twenty-one Americans aboard

Oct. 28—American ship Lanoe sunk off Portsmouth by submarine

Oct. 28—British steamer Marina sunk without warning by German submarine, six Americans killed

Nov 7—American steamer Columbian shelled and sunk by German submarine off Spanish coast

Nov 28—American merchantman Chemung sunk off Andalusia

Nov 28—Germany refuses to give United States Consul Pike right to cross Germany from Warnemunde to Switzerland

Nov 28—United States sends protest against deportation of Belgians to Germany

Dec 4—Italian steamship Palermo, with twenty-five Americans aboard, sunk

Dec. 14—British ship Russian, with seventeen Americans aboard, sunk

1917

Jan 11—Franz Bopp, German consul-general at San Francisco and Baron George von Brincken, convicted of conspiring to injure American shipping munitions plants, etc, and sentenced to two years imprisonment

Jan 19—British steamer Yarrowdale sunk, seventy-two American seamen taken as prisoners to Germany

Jan 22—President Wilson addresses senate on a world league for peace, proposes a peace without victory

Jan 31—Germany gives United States Ambassador Gerard in Berlin six hours notice of opening of ruthless submarine warfare declares ships will be sunk within specified zone around British Isles whether neutral or not if submarine has not time to warn or allow men to escape

Feb. 2—In view of Germany's summary breaking of pledges regarding safety of neutrals in submarine zone President Wilson breaks diplomatic relations and gives Ambassador Bernstorff his passports The latter was given safe conduct to Germany

Feb 3—American merchantman Holbatonic sunk by submarine

Feb 12—American merchantman Lyman M. Law sunk by German submarine

Feb 21—Publication is made of intercepted note from German Foreign Secretary Zimmermann to German minister in Mexico City, dated Jan. 19, 1917, proposing alliance between Mexico Japan and Germany and suggesting Mexico be paid by annexation of American southwestern states for co-operation with Germany

Feb 25—Spanish embassy in Berlin informed men from Yarrowdale had been released Men reached Switzerland March 11, complained of cruel treatment as prisoners of war

Feb 26—British steamer Laconia sunk; five Americans killed

March 2—American merchantman *Algonquin* sunk by German submarine with shell fire and bombs, crew escapes

March 8—Dr Chakraborty, prominent in Indian independence movement, admits getting \$60,000 in New York from Wolf von Igel, German agent, to start trouble in India

March 9—President Wilson orders navy department to arm American merchant vessels

March 9—President Wilson calls congress to meet in extraordinary session April 16

March 12—United States serves formal notice on neutrals of severance of relations with Germany and asks neutral support

March 14—China informs United States it has severed diplomatic relations with Germany

March 17—First armed American liner, *St. Louis*, leaves New York, carrying naval gun crew under decision of president allowing American ships to arm

March 18—Three American ships sunk by submarine—City of Memphis, Illinois and *Vigilancia*, fifteen members of *Vigilancia* crew lost

March 21—President Wilson calls congress to meet April 3, instead of April 16

March 22—American oil ship *Headton*, with cargo worth \$2,150,000, sunk by submarine, seven Americans killed

March 22—Immense mass meeting in New York demands action against Germany, 12,000 pledge loyalty

March 22—Capt Franz Rintelen of German navy and two others convicted in New York of conspiracy to interfere with shipment of munitions

March 24—President Wilson orders Brand Whitlock, United States minister, and all consuls in Belgium to leave

March 25—President Wilson signs bill to increase navy personnel by 26,000 men to 87,000

March 25—War department calls units of national guard in nine states and District of Columbia, 13,000 men

March 28—War department calls 25,000 men

March 30—The federal government calls on all government employes, totaling 500,000, to aid secret service department in detecting spies and plots

April 1—American steamer *Azteco*, 3,722 tons, value \$600,000, sunk off Brest, twenty-eight men, including Boatwain's Mate Populucci, of United States naval guard, dead

April 2—Six Germans convicted in New York of conspiracy to destroy munitions ships by bombs, among them the chief engineer of the German steamship *Friedrich der Grosse*, and four assistant engineers

April 2—The 65th congress meets in special session and President Wilson asks it to declare that a state of war exists between the United States and Germany

April 4—American merchantman *Missourian*, left Genoa April 4, 4,981 tons, sunk without warning in Mediterranean

April 4—Senate votes war resolution

April 5—Disclosures made showing that an office for the issuance of fraudulent American passports to German reservists was maintained by Hans von Wodell and others under the supervision of Capt. von Papen and with the assistance of Wolf von Igel

April 5—Belgian relief ship *Trevlar*, 2,991 tons, carrying food to Belgium, torpedoed

April 6—House votes war resolution

April 6—War measure signed by President Wilson

Formal war proclamation is issued

The Nation at War. When war was imminent the administration called for volunteers to join the regular army, the navy and the marine corps, but the decision to enter the war on a major scale brought with it the necessity of a new military policy. The President therefore asked Congress to pass a selective draft law. Such a bill passed both Houses, and was signed by the President on May 18. On June 5 about 10,000,000 men between the ages of twenty-one and thirty-one were registered, and selections for a new national army were soon under way.

The government established sixteen training camps for drilling the national guard (state militia) units, sixteen for training the army to be selected from conscription, and eighteen great aviation fields. On September 2, the first detachments of 600,000 selected men were sent to the training grounds, in May, 1918, the second contingent of 583,000 was called. The regulars were mobilized earlier.

In the meantime Major-General John J. Pershing was appointed commander in chief of the American forces to be sent to France. The American army in France was known as the "American Expeditionary Force" (A E F), and the first contingent reached French soil on June 27.

It was announced that Secretary of War Baker was prepared to have 2,000,000 soldiers in France by the autumn of 1918. Secretary Baker visited France in March and April, 1918, to acquaint himself with the actual conditions. In May Congress provided ample appropriations for an army of between 3,000,000 and 5,000,000 men, should such a host be needed.

First American Losses. In October, 1917 the American nation was informed that after months of training its first soldiers had been sent to the battle front. The location selected for them, while requiring confidence and technical skill, was in a comparatively quiet sector almost on the Franco-German

border east of Nancy. On November 3 they had a spirited encounter with German troops in a trench-raiding enterprise, in which the latter were repulsed. Three Americans—Privates Thomas F. Enright, Pittsburgh, Pa., James B. Gresham, Evansville, Ind., and Merle D. Hay, Ghidzen, Iowa—were killed, eleven were wounded, and a like number were captured by the enemy. The number of Americans whose training was completed increased rapidly from that time, and many divisions were in the battle line when the great German offensive began in March, 1918.

First Losses at Sea Before the end of 1917 the ability of the government to send soldiers to France was limited only by the transport service. In September the United States commandeered and placed in commission sixteen passenger vessels belonging to Germany and Austria which had been interned in American waters, thus materially adding to the allied overseas fleet. Among these was the *Vaterland*, the largest vessel afloat, this boat was renamed the *Leviathan*. The carrying capacity of the sixteen was about 50,000 soldiers. Before the end of the year troop movements were greatly accelerated and until February 6 not an American soldier had been lost en route to France through submarine-infested waters. On that day the steamer *Tuscana*, one of many ships in care of a British convoy, was sunk by a torpedo off the north coast of Ireland. There were 2,179 United States troops of the 32nd Division aboard and all except 171 were saved.

"Liberty" Loans Upon entry into the war hitherto unheard-of appropriations of money were required to maintain a vast army and greatly increased navy. Before many months had elapsed the United States government was spending over \$1,000,000,000 per month, including loans to allied nations. To meet such expenditures income taxes were increased, many internal revenue taxes were more than doubled, many special taxes were levied and the nation began to borrow money from its citizens.

These bonds were appropriately called "Liberty" bonds. The first loan was called for June 15, 1917, and \$2,000,000,000 was solicited. It was more than 50 per cent oversubscribed, the amount realized being \$3,035,226,850; the interest rate was 3½ per cent. The second loan was called for October 28, for \$3,000,000,000. This, too, was as



Private Enright, Private Gresham, Private Hay, we salute you! Yours have become imperishable names upon the Roll of Honor for to you belongs the proud distinction of having been the first of this nation's forces in France to make the supreme sacrifice.

While cannon boomed a grim accompaniment, the profound thanks of a great sister nation went out to you from the lips of that French commanding officer who officiated at your simple burial—

"In the name of the —th division, in the name of the French army, and in the name of France I bid farewell to Private Enright, Private Gresham and Private Hay of the American army."

"Of their own free will they had left a prosperous and happy country to come over here. They knew that the forces fighting for honor, love of justice and civilization were still checked by the long-prepared forces serving the powers of brutal domination, oppression and barbarity. They knew that efforts were still necessary. They wished to give up their generous hearts and they had not forgotten old historical memories while others forgot more recent ones. We will therefore ask that the mortal remains of these young men be left here, left with us forever. We inscribe on the tomb: 'Here lie the first soldiers of the republic of the United States to fall on the soil of France for liberty and justice.' The passerby will stop and uncover his head. Travelers and men of heart will go out of their way to come here to pay their respective tributes. 'Private Enright! Private Gresham! Private Hay! In the name of France I thank you. God receive your souls! Farewell!'"

heavily oversubscribed, the amount realized being \$4,617,632,300; the interest rate was 4 per cent. The third loan was for \$3,000,000,000, called for May 4, 1918. It realized

about \$4,000,000,000, and was one-third oversubscribed. The interest was $4\frac{1}{4}$ per cent. In September the fourth loan of \$8,000,000,000 was called, this, too, being oversubscribed. After hostilities ceased a fifth loan, appropriately called the "Victory Loan," calling for \$4,500,000,000, was oversubscribed.

In addition to these major loans, the government inaugurated during the same period the sale of "thrift" stamps of 25 cents face value, to be exchanged in quantities for \$5 bonds, called "baby" bonds, to mature in five years.

Aircraft Program One of the earliest appropriations of Congress was for \$840,000,000 to build factories for the production of flying machines for war purposes and to manufacture them in large quantities. A superior engine was produced and it was named the "Liberty" motor. The public was led to expect production on a large scale by January, 1918, but in this department of war activity the results achieved in a year were exceedingly disappointing. Several thousand machines were built during that time for students in the national aviation camps, but until the late summer of 1918 there were no battle, bombing or observation planes in Europe. Hundreds of American aviators in France were provided with machines of British and French manufacture.

Work of the Navy Immediately following the declaration of war the American navy was ready for active duty. In May a large number of torpedo-boat destroyers, submarine chasers and vessels of larger size were sent into European waters to oppose with the British and French the submarine menace. In command of the American contingent was Vice-Admiral Sims. Between 1914 and 1918 the navy was increased over one hundred per cent in number of vessels, though not in tonnage, and the personnel was more than trebled.

Early Campaigns of 1918. Germany prepared for a supreme offensive in the spring, and the entente allies prepared for it as best they could, but knew not at what points between the North Sea and Switzerland to expect it. That it would prove the supreme test of the war was deemed certain, for Germany had moved scores of divisions of troops from the Russian front to face its foes in France. The strength of the Central Powers in France was estimated at 220 divisions, or

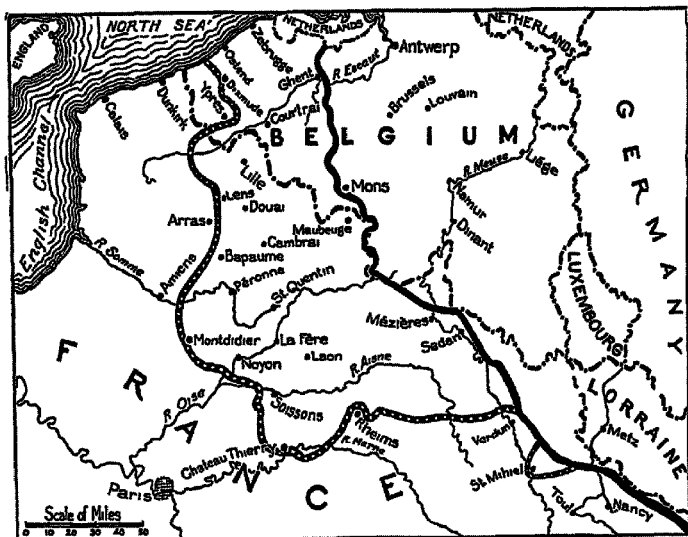
about 2,500,000 fighting men, with great reserve forces to fill ranks thinned in battle. In the approaching crisis the American General Pershing placed his entire command and all supplies he possessed at the disposal of the allies. General Ferdinand Foch of the French Army was placed in supreme command of the unified allied forces, and he was given the title of marshal.

On March 21 the German offensive began on a 50-mile front in Northeastern France, of which Amiens was practically the center and one important objective. German troops in close formation, assisted by thousands of great guns, rolled in great waves westward and by April 8th the British, who had been selected as the first Tenthon opponents, were pushed back in places about twenty-five miles. It was the German plan to separate the British and French armies, then to render the former non-effective. Afterwards the French could be brought to terms.

Early in April the British elected to make a stand. They had retired in good order and the armies were intact. The Germans, who had advanced in solid formation, suffered immense losses, and were forced for a time to suspend their assaults to reform their divisions. On April 21, with "backs to the wall," the British succeeded in halting the progress of their enemy in a battle which it is said astounded the German high command. In Belgium Hindenburg's forces had taken Messines Ridge and Kemmel Hill, two very important heights, but they could at the time go no farther. Another period of time elapsed for a second realignment of forces. Amiens was yet nine miles west of the foremost German lines, and Ypres was still three miles within the allied lines.

On May 27 the Germans renewed their offensive on a scale nearly as ambitious as that of March 21, on a front of forty-eight miles. Over 800,000 men were hurled against the allies, with an equal number in reserve. The main offensive was directed towards Paris, in four days twenty-six miles were gained, and the Germans were again on the Marne River on June 1, from which they had been driven in 1914. On June 9 another offensive gained a few more miles; it was then definitely halted.

Attack on Zebrugge In April, 1918, a detail of ships from the British navy made a spectacular attack on the heavily-protected submarine bases of the Germans at Ostend



THE FINAL BATTLE LINE

The dotted line represents the Western Limits reached in the tremendous German drive which began on March 21 and ended the middle of July. Thereafter Marshal Foch and his allied armies were masters of the situation and their enemy forces were driven steadily and persistently back toward Germany. The solid, heavy line indicates the battle front on the day the armistice was signed. The broken lines are territorial boundary lines.

and Zeebrugge. At the latter point, particularly, the Englishmen scored heavily. They sank three obsolete vessels filled with cement in the harbor entrance, destroyed a section of the mole and severely damaged a number of German light war vessels and much of the military defenses. The defenders were completely surprised. It was the most daring exploit of any naval contingent in the war. On May 10, the feat was repeated at Ostend, with heroism equally great, an obsolete warship cement filled, was sunk in the harbor mouth.

The Last Days On June 1 the Germans were within forty-six miles of Paris. The speed of their gigantic drive was slackened, and in succeeding efforts they gained a total of only fifteen miles, which brought them within thirty-one miles of the French capital. At this point the forces of the United States began to make their presence felt. The first thrilling move by a wholly American contingent was at Belleau Wood, where United States marines fought with such valor and

success that the grateful French republic renamed the spot the "Wood of the American Marines." The encounter which finally stopped the German advance and which marked the turning point of the war was the exploit of American marines, in the second Battle of the Marne on July 21, when they threw back the advancing enemy at Chateau Thierry. Together the Americans and the French pushed this advantage so rapidly that before the end of the month the German Crown Prince fled from the Marne salient and withdrew his army as rapidly as possible.

The above successes immediately stiffened the allied lines, and what had been for three months a desperate defense was turned into an offensive movement from the North Sea to Switzerland which the German high command could not slacken. Mile by mile, day after day, the German forces retreated, but offered vicious rear-guard engagements in which many thousand machine guns were employed to stop the advancing allies.

In September a new American man-power bill became effective, the selective draft having been extended to men from thirty-one to forty-five. Foch knew that he had unlimited reserves to fall back upon, and the offensive against the Germans was pressed with vigor. One by one the cities of France which had been dominated by the Germans for four years were retaken. Soissons, Cambrai, Saint Quentin, Noyon, Lens and Lille again became French, and the famous "Hindenburg line" was permanently broken.

On September 13 the American First Army corps were assigned the task of driving the Germans from the southern end of the battle line. In two days they cleared the Saint Mihiel salient and later attempted the most difficult task of driving the foe from the hilly Argonne Forest region, north of Verdun. The attention of the world was turned more particularly to the spectacular retreat of the Germans farther north, but the American task in the Argonne region, one of the stiffest fighting problems of the entire war, was a highly important adventure. Metz was the objective of the Americans, and had not the surrender of the Germans occurred on November 11, the Americans would eventually have reached it. On the day before the armistice was signed they entered Sedan, the historic city which had witnessed the disastrous battle which imposed a German peace upon France in 1871.

In Belgium, meanwhile, Field Marshal Haig and King Albert were driving the Germans out of the country that had first felt the brunt of the war. By November 9 (see accompanying map), the Germans had not only abandoned the coast, but retired from the whole country west of Ghent. Had not the Germans secured an armistice on November 11 their armies would have suffered an overwhelming defeat, a fact the new German government admitted in August, 1919. Their position was rendered doubly precarious by the downfall of their three allies.

Collapse of Bulgaria. In the middle of September an allied army made up of French, British, Italian, Greek, Serbian, Czech-Slovak and Jugo-Slavic forces under General Franchet d'Esperey, began a vigorous offensive against the Bulgarian forces in Macedonia. The Bulgars were soon in full retreat, and when Sofia itself was threatened the Bulgarian government asked for an ar-

mistice. On September 30 fighting ceased, the Bulgars having surrendered unconditionally. The capitulation of Bulgaria opened the way for the liberation of Serbia, Montenegro and Rumania, destroyed Germany's *Mittel Europa* plans, cut off direct communication with Turkey and paved the way for the collapse of both Austria and Germany.

Surrender of Turkey. After the capture of Jerusalem, at the close of 1917, General Allenby began extensive preparations for a campaign to put Turkey out of the war. In the later operations he was assisted by Arabian forces, as the kingdom of Hedjaz (see ARABIA) had declared its independence of Turkey in November, 1916, and had become a valued member of the entente. In September British and Arabs began an advance in Mesopotamia and Palestine, which came rapidly to a climax. Toward the close of the month the British reached the Sea of Galilee, while the Arabs carried everything before them east of the Jordan. In October Damascus fell; later in the month Aleppo, the Turko-German base for the armies in Asia Minor, was captured, and about the same time the Turks were completely defeated along the Tigris, and communications with Mosul were cut.

In view of the breakdown of their forces, the Turks could no longer hold out, and asked for an armistice. General Townshend, who had been a prisoner since the surrender of Kut-el-Amara, bore the note asking for terms, which he delivered to the allied commander of the Aegean fleet. Negotiations were held on the island of Lesbos, and terms were signed on October 30. Among the armistice provisions was the opening of the Dardanelles to the allies.

Austria-Hungary Capitulates. The closing weeks of the war saw Italy retrieving the great disaster of 1917. In June the Austrians began an attack on the Asiago Plateau and along the Piave River, but the movement failed. On October 24 the Italians, with help of a few divisions of their allies, began a major offensive against the Austrians, which developed into one of the most brilliant victories of the war. Trent, Udine and Trieste were occupied, and the Austro-Hungarian army was routed.

Austria-Hungary asked for an armistice on October 31, and terms were accepted on November 1. As one of these terms granted

the allies the right to occupy any Austrian territory desired, the armistice made an invasion of Germany from the south a near possibility. The Germans, who were losing their own fight, saw the hopelessness of continuing the struggle, and they, too, accepted drastic armistice terms.

Germany Asks for Peace. As soon as the surrender of Bulgaria became known in Germany there was a political upheaval, Chancellor von Hertling resigning, and Prince Max of Baden, a moderate man of democratic tendencies, succeeding him on October 2. A coalition Ministry was formed, in which the Social Democrats were represented by Scheidemann and Bauer. On October 5 President Wilson was requested to take steps for the restoration of peace. A series of notes between Germany and the United States followed, in which President Wilson obtained sweeping concessions from the German government, such as promises to cease attacks on merchant ships, to evacuate all occupied territory and to accept those principles which had been laid down in various war messages. On November 5 the allied and associated governments authorized Marshal Foch to state the terms on which they would enter into an armistice. German envoys were at once sent to French headquarters, and on November 11 they signed the following allied demands:

Evacuation within fourteen days of Belgium, France, Alsace-Lorraine and Luxembourg.

Surrender of 5,000 guns, half field and half artillery, 25,000 machine guns, 3,000 flame throwers, and 1,500 airplanes.

Surrender of 5,000 locomotives, 150,000 cars, 50,000 wagons and 10,000 motor lorries.

Surrender of railways of Alsace-Lorraine and stores of coal and iron there.

Immediate return of allied prisoners, but German prisoners not to be returned before peace was signed.

Evacuation of west bank of the Rhine, the allies to hold the crossing of the river at Coblenz, Cologne and Mayence for a twenty-mile radius.

The east bank of the Rhine to become a neutral zone and to be evacuated in nineteen days.

German troops to retire at once from any occupied territory which before the war belonged to Russia, Rumania and Turkey.

The allied force to have access to this evacuated territory.

Abrogation of Brest-Litovsk and Rumanian treaties.

Evacuation of all German forces in East Africa within one month.

Surrender of all German submarines.

Surrender of seventy-four warships, including fifty destroyers, ten battle-ships, six battle cruisers and eight light cruisers.

Restitution for damage done by German armies in invaded territories.

Return of cash taken from the national bank of Belgium.

Return of gold taken from Russia and Rumania.

Summary of the War. The chief events of the War of the Nations are summarized below for ready reference.

1914

June 28—Archduke Francis Ferdinand and wife assassinated in Sarajevo, Bosnia.

July 28—Austria-Hungary declares war on Serbia.

Aug. 1—Germany declares war on Russia, general mobilization begun.

Aug. 4—State of war between Great Britain and Germany is declared, Germany declares war on Belgium.

Aug. 6—Germans capture Liege.

Aug. 20—German troops enter Brussels.

Aug. 23—Japan declares war on Germany, Russians victorious in East Prussia.

Aug. 25—Large part of Louvain destroyed by Germans.

Aug. 28—British win naval battle near Heligoland.

Aug. 29—Germans inflict heavy defeat on Russians at Allenstein, Germans occupy Amiens.

Sept. 1—Germans win decisive victory at Tannenberg, East Prussia, cross the Marne in France.

Sept. 2—Lemberg captured by Russians, seat of French government transferred from Paris to Bordeaux.

Sept. 5—England, France and Russia sign compact not to conclude peace separately.

Sept. 6—Allies win battle of Marne.

Sept. 7—Germans retreat from the Marne, capture Maubeuge.

Sept. 7-10—Germans retreat to the Aisne.

Sept. 14—Battle of Aisne begins, pursuit by allies halted.

Sept. 15—First battle of Soissons fought.

Sept. 18—Germans bombard Reims and damage cathedral.

Sept. 19—Battle of Aisne develops into continuous trench fighting.

Sept. 20—Russians capture Jaroslavl and begin siege of Przemyśl.

Sept. 23—British cruisers Cressy, Aboukir and Hogue torpedoed and sunk in the North Sea.

Oct. 9-10—Germans capture Antwerp.

Oct. 12—Germans capture Ghent.

Oct. 20—Fighting along the Yser river begins.

Oct. 29—Turkey begins war on Russia.

Nov. 1—British cruisers Good Hope and Monmouth sunk off Coast of Chile.

Nov. 7—Tsingtao captured by Japanese.

Nov. 9—German cruiser Emden destroyed.

Dec. 8—German cruisers sunk near Falkland islands by British fleet.

Dec. 9—French government officials return to Paris.

Dec 14—Belgrade recaptured by Serbians
Dec 17—Britain formally assumes a protectorate over Egypt
Dec 25—Italy occupies Avlona, Albania

1915

Jan 1—British battleship Formidable sunk
Jan 11—Heavy fighting northeast of Soissons
Jan 24—British win naval battle in North sea, sinking the German cruiser Bluecher and damaging two other cruisers
Feb 11—Germans evacuate Lodz
Feb 12—Germans drive Russians from positions in East Prussia, taking 26,000 prisoners
Feb 19—British and French fleets bombard Dardenelles forts
March 1—Premier Asquith announces blockade by allies of all German, Austrian and Turkish ports
March 10—Battle of Neuve Chapelle begins
March 14—German cruiser Dresden sunk
March 18—British battleships Irresistible and Ocean and French battleship Bouvet sunk in Dardanelles strait
March 22—Fortress of Przemyel surrenders to Russians
April 22—Germans force way across Ypres canal at Steenstraete and Het Sas
May 2—Austro-Hungarian and German forces repulse Russians along the entire front of Malatow, Gorlice, Gromlik and north of these places in West Galicia
May 7—Liner Lusitania torpedoed and sunk by German submarine
May 23—Italy formally declares war on Austria and orders mobilization of army
June 3—Przemysl recaptured by Germans and Austrians
June 22—Germans and Austrians capture Lemberg
July 2—Tolmino falls into hands of Italians
July 20—Warsaw evacuated, Lublin captured by Austrians
Aug 2—Germans occupy Mitau
Aug 3—Battle of Hooge
Aug 4—Germans occupy Warsaw
Aug 5—Ivangorod taken by Germans
Aug 6—British land at Suvla bay, Gallipoli
Aug 17—Germans capture Kovno
Aug 19-20—Germans take Novo Georgievsk
Aug 26—Germans take Brest-Litovsk
Sept 2—Germans capture Grodno
Sept 5—Grand Duke Nicholas sent to the Caucasus
Sept 8—Russians stop Germans at Tarnopol
Sept 19—Germans capture Vilna
Sept 20—Austrians and Germans begin drive on Serbia
Sept 25-30—Battle of the Champagne
Oct 3-10—Austro-Germans capture Belgrade
Oct 12—Edith Cavell executed by Germans
Oct 13—Bulgaria declares war on Serbia
Oct 22—Bulgarians occupy Uskub
Nov 7—Italian liner Ancona sunk
Nov 22—British victory near Bagdad
Nov 30—Bulgarians take Prizrend
Dec 1—British retreat from Bagdad
Dec 8-9—Allies defeated in Macedonia

Dec 15—Sir John Douglas Haig succeeds Sir John French
Dec 27-30—Heavy Russian offensive in Galicia and Bessarabia
Dec 30—Liner Persia sunk in Mediterranean

1916

Jan 6—Russians capture Czartorysk
Jan 8—British troops at Kut-el-Amara surrounded
Jan 9—British evacuate Gallipoli peninsula
Jan 10—Austrians capture Mount Lovcen in Montenegro, predreadnought King Edward VII sunk
Jan 13—Cetinje, capital of Montenegro, captured by Austrians
Jan 23—Scutari, capital of Albania, captured by Austrians
Feb 15—Erzerum captured by the Russians
Feb 21—Germans under crown prince begin attack on Verdun defenses
Feb 26—Germans capture Fort Douaumont, French transport La Provence sunk
March 2—Bittlis captured by Russians
March 10—Admiral von Tirpitz resigns
March 24—Sussex torpedoed and sunk
April 5-7—Battle of St Etier
April 17—Trebizond captured by Russians
April 18—President Wilson sends final note to Germany
April 19—President Wilson explains diplomatic situation in speech before congress in joint session
April 24—Insurrection in Dublin
April 29—British force at Kut-el-Amara surrenders to the Turks
April 30—Irish insurrection suppressed
May 2—Several leaders of Irish revolt executed
May 15—Austrians begin offensive against Italians in Trentino
May 31—Great naval battle off Danish coast
June 3—Germans assalt British at Ypres, Russians under Gen Brussiloff begin successful offensive
June 5—Lord Kitchener lost with cruiser Hampshire
June 6—Italians stop enemy in Trentino
June 11—Russians capture Dubno
June 13—Russians capture Cernowitz
June 25—Gen Brussiloff's army completes possession of Bukovina
July 1—Battle of Somme begins
July 25—Erzingan captured by the Russians
July 26—Fozieres taken by British
July 27—British take Delville wood, Serbs begin attack on Bulgars in Macedonia
Aug 2—French take Fleury
Aug 3—Sir Roger Casement executed for treason
Aug 5—British win victory north of Fozieres
Aug 9—Italians take Gorits by assault
Aug 15—Russians capture Jablonitz
Aug 18—Serbs capture Florina from Bulgars
Aug 24—French take Maurepas
Aug 27—Italy declares war against Germany
Aug 28—Roumania declares war against Austria-Hungary
Aug 30—Roumanians take Kronstadt in Transylvania, Bulgars seize Drama

Sept. 2—Roumanians take Orsova and Hermannstadt.
 Sept. 3—Allies take Guilleumont and Clerly
 Sept. 7—Germans capture Tutrakan
 Sept. 8—French recapture Fort Douaumont
 Sept. 10—German-Bulgar forces take Silistria
 Sept. 15—British take Fiers, Martinpulo and Courcellette, French reach outskirts of Rancourt.
 Sept. 17—French take Vermandovillers and Berny
 Sept. 25—British capture Morval and Les Boeufs
 Sept. 26—French and British take Combles, British take Thiepval and Guedecourt.
 Sept. 28—Venizelos proclaims provisional government in Greece, to aid allies
 Sept. 30—Germans defeat Roumanians at Hermannstadt.
 Oct. 2—Germans recapture Kronstadt from Roumanians
 Oct. 11—Germans defeat Roumanians in Alt valley and begin invasion of Roumania
 Oct. 13—Italians win victory on Carso plateau
 Oct. 23—Germans capture Constantza
 Oct. 24—Germans take Fradeal
 Oct. 25—Germans capture Vulcan pass
 Nov. 3—French recapture Fort Vaux.
 Nov. 12—French take all of Salihel.
 Nov. 13—British win battle of Ancre
 Nov. 15—Monastir taken by Serbs, French and Italians
 Nov. 24—Germans capture Orsova and Turnu-Severin
 Nov. 25—Venizelist provisional government in Greece declares war on Germany
 Nov. 28—Seat of Roumanian government removed from Bukharest to Jassy
 Dec. 3—Battle of Argues won by Germans
 Dec. 5—British cabinet resigns
 Dec. 6—Bukharest occupied by German forces
 Dec. 10—New British cabinet formed with David Lloyd George at its head
 Dec. 11—Italian battleship Regina Margherita sunk
 Dec. 12—Germany proposes peace negotiations
 Dec. 15—French recapture Vacherauvilla, Louvemont and Fort Harcourt.
 Dec. 12—President Wilson sends note to belligerent nations asking them to make known their peace terms and to neutral nations suggesting that they support America's action
 Dec. 28—Germany replies to President Wilson saying a direct exchange of views would be best way to bring about peace—gives no terms
 Dec. 28—Scandinavian countries express sympathy with President Wilson's suggestions
 Dec. 30—Allies make joint reply to Germany's peace proposal rejecting it as a war maneuver

1917

Jan. 2—Germans complete conquest of Dobrogea.
 Jan. 7—Russians take offensive along Sereth river
 Jan. 9—British battleship Cornwallis sunk

Jan. 10—Allies make joint reply to President Wilson and give their peace terms
 Jan. 11—German government issues note commenting on entente's reply of Dec. 30
 Jan. 13—Arthur Balfour, British secretary for foreign affairs, sends note commenting on President Wilson's peace suggestions
 Jan. 14—Galatz under bombardment, German attacks on Riga front fall
 Jan. 15—Germans defeated on the Sereth river
 Jan. 17—British advance on both sides of Ancre creek
 Jan. 20—Germany defends deportations of Belgians, Russians routed at Nanesti
 Jan. 22—President Wilson addresses United States senate on subject of world peace and the establishment of a league of nations
 Jan. 22—Battle between British and German destroyers in North sea
 Jan. 25-26—Fighting on Hill 304 and Mort Homme hill near Verdun
 Jan. 28—Russians win battle of Monte Causol, British auxiliary steamer Laurentic sunk
 Jan. 31—Ambassador Count von Bernstorff hands note to Secretary Lansing in Washington announcing the inauguration by Germany of an unrestricted submarine warfare on Feb. 1, Germany proclaims boundaries of blockade zones
 Feb. 1—Germany begins unrestricted submarine warfare
 Feb. 3—President Wilson orders that Ambassador Count von Bernstorff be handed his passports, directs the withdrawal of Ambassador James W. Gerard and all American consuls from Germany and announces his action in a speech before congress, suggests to neutral countries that they follow America's example
 Feb. 3—American steamer Housatonic torpedoed and sunk
 Feb. 5—President Wilson forbids transfer of American ships to foreign registry, German ships interned at Manila seized
 Feb. 7—British capture Grandcourt, German ships interned in American ports found crippled by crews
 Feb. 8—Germany detains Ambassador Gerard in Berlin, liner California torpedoed and sunk with loss of forty-one lives
 Feb. 13—Ambassador Bernstorff sails for Germany via Halifax and Norway
 Feb. 14—Scandinavian countries protest against Germany's sea warfare
 Feb. 15—Germans under crown prince take a mile and a half of French trenches between Reims and Verdun
 Feb. 17—British troops capture enemy positions along a front of two miles on both sides of the Ancre
 Feb. 18—Entrance to New York harbor closed by steel net
 Feb. 24—British take village of Petit Miramont and advance on a front of a mile, Germans withdraw under cover of fog
 Feb. 25—"Hindenburg retreat" from Somme sector in full progress, British win at Sannaiyat on the Tigris, British take Serre and Butte de Warlencourt.

- Feb 26—President Wilson appears before congress and asks authority to supply merchant ships with defensive arms and to employ other methods to protect American ships and citizens, British capture Kut-el-Amara
- Feb 27—British take Gonnescourt
- Feb 28—The Associated Press reveals German plot to bring Mexico and Japan in alliance against the United States, letter from the German secretary of foreign affairs, Dr Alfred Zimmermann, to the German minister to Mexico suggesting the plan, published
- March 1—President Wilson, at request of senate, confirms existence of German plot in Mexico, house grants president power to arm merchant ships
- March 2—Germany announces that on March 1 the final limit of grace for sailing vessels on the Atlantic expired, Russians capture Hamadan
- March 3—Foreign Secretary Zimmermann admits authenticity of letter to German minister to Mexico suggesting alliance against the United States
- March 6—British invade Palestine and capture Hebron, United States supreme court decides Appam case in favor of owners
- March 8—Count Ferdinand von Zeppelin dies, French regain trenches in Champagne
- March 9—President Wilson calls a special session of congress for April 18, issues orders for the arming of American merchant ships
- March 10—Belgian relief steamer Storstad torpedoed
- March 11—Successful revolution in Russia, British capture Bagdad, Ambassador Gerard reaches Havana
- March 12—French capture Hill 185 in Champagne, state department in Washington gives formal notice of arming of American ships, American steamer Algonquin sunk without warning by German submarine, China breaks relations with Germany
- March 14—German chancellor promises reforms to Prussian diet
- March 15—Czar Nicholas II of Russia abdicates throne for himself and son The action was forced
- March 16—Grand Duke Michael Alexandrovich renounces assumption of supreme power in Russia, British take St Pierre Vaast wood, American steamer Vigilancia torpedoed with loss of fifteen lives
- March 17—British take Bapaume, French take Roye, American ship City of Memphis sunk
- March 18—British and French take Peronne, Chauvnes, Neule and Noyon, make ten mile gain on seventy mile front, Germans destroy everything in abandoned territory, American ship Illinois sunk by submarine
- March 19—American oil ship Healdton torpedoed with loss of a score of lives, French battleship Dauton torpedoed with loss of 296 men, British and French continue advance, Germans say retreat is for strategic purposes
- March 20—French and British take a score of villages in their advance
- March 21—President Wilson calls extra session of congress to begin April 2 instead of April 18, "state of war" admitted to exist
- March 22—America recognizes new government in Russia
- March 23—French troops reach vicinity of St Quentin
- March 24—Washington announces withdrawal of Minister Brand Whitlock and American relief workers from Belgium, constitutional party in Russia votes for republican form of government, Germany extends barred zone to Russian arctic waters
- March 25—President Wilson calls part of national guard in the east into the national service for policing purposes
- March 26—British defeat large force of Turks at Gaza, Palestine, President Wilson calls into federal service 20,000 guardsmen in eighteen central states
- March 27—British advance towards Cambrai, French approach La Fere
- March 29—Chancellor von Bethmann-Hollweg makes speech in reichstag saying that blame will be on America if war comes
- March 30—Foreign Secretary Zimmermann, in reichstag, explains his effort to embroil Mexico and Japan with the United States, German raider Seeadler sends captives to Rio Janeiro, President Wilson and cabinet decide hat war with Germany is the only honorable recourse left to the United States
- March 31—More national guard units mobilized in the United States
- April 1—The Aztec, an armed American steamer, sunk by submarine, Russian armies invade Turkey from Persia
- April 2—Special session of American congress opens, president in address asks that existence of a state of war with Germany be declared
- April 3—Russian relief steamer Trevor torpedoed
- April 4—Senate passes war resolution, American steamship Missourian sunk in Mediterranean
- April 5—Brazilian ship Parana sunk by submarine, British and Russian armies in Mesopotamia
- April 6—House passes war resolution, president signs resolution and issues war proclamation, all American naval forces mobilized, German vessels in American ports seized, Germans blow up their auxiliary cruiser Cormoran at Guam
- April 7—Cuba declares war on Germany, Panama declares that it will assist the United States in the defense of the Panama Canal
- April 8—Austria-Hungary announces break in relations with the United States
- April 9—Canadians take Vimy ridge in great British offensive north and south of Arras, Austrian ships interned in American harbors seized, Chile announces it will remain neutral

- April 10—Brazil breaks off relations with Germany, Argentine government says it will support the United States, Eddystone ammunition plant explosion kills 125 persons
- April 11—Costa Rica places its ports at disposal of the United States
- April 12—Bolivia breaks with Germany, Argentine ship Monte Protegido sunk by submarine
- April 12—Barred defense zones around American harbors proclaimed by president, Russian and German socialists dickering on peace terms, British drive Germans back on twelve-mile front near Loos
- April 14—House of representatives passes \$7,000,000,000 war loan bill without opposition, Paraguay expresses sympathy with the United States in the war with Germany, Uruguay condemns German submarine warfare and expresses sympathy with the United States
- April 15—Great French offensive between Soissons and Reims begins, President Wilson issues proclamation warning traitors, British transports Cameronia and Arcadian sunk with heavy loss of life
- April 17—Senate passes war loan bill unanimously, British hospital ships Donegal and Lanfranc sunk
- April 18—Germans driven out of six villages between Soissons and Reims
- April 19—American liner Mongolia sinks German U-boat, Nicaragua indorses entry of United States into war with Germany
- April 20—"American day" in Britain, special services held in St. Paul's cathedral, Berlin admits retirement to "Hindenburg line" in face of allied attacks, two German destroyers sunk off Dover
- April 21—Turkey breaks off relations with the United States, Balfour mission arrives in the United States
- April 22—British mission arrives in Washington, Americans closing missions in Turkey, "United States day" celebrated in Paris
- April 23—British begin new attack on Arras front, British capture Samarra
- April 24—Joffre-Viviani French mission arrives in America, President Wilson signs big bond act
- April 25—Joffre-Viviani mission given ovation in Washington, president appoints Blüth Root head of mission to visit Russia
- April 26—Britain withdraws shipping blacklist so far as concerns America
- April 28—Senate and house pass army draft bill, Guatemala severs relations with Germany, Secretary McAdoo announces that bond issues will be called "liberty loan" of 1917
- April 30—Argentine congress adopts resolution in favor of strict neutrality
- May 1—Strikes in munitions factories in Germany reported
- May 2—United States begins making large loans to allies
- May 4—American destroyers arrive in British waters and begin patrol work, Russian council of workmen and soldiers declares for peace without annexations or indemnities but sustains provisional government, British transport Transylvania sunk with loss of 413 lives
- May 5—Great Britain joins French in asking that American troops be sent to France at once
- May 6—International socialists conferring on peace in Stockholm
- May 9—Liberia ends relations with Germany
- May 10—Secretary Lansing says United States and allies will consider peace terms jointly
- May 11—Congress of Haiti refuses to declare war on Germany
- May 14—Espionage bill passes senate
- May 16—British government suggests two plans for settling Irish question
- May 17—First American Red Cross hospital unit arrives in England for service with the British in France, Honduras severs relations with Germany
- May 18—President Wilson orders the sending of a division of regulars to France under Maj-Gen J J Pershing, issues proclamation fixing June 5 as date for the registry of men eligible for army service under draft law
- May 19—Nicaragua breaks off relations with Germany, Russian provisional government reorganized, President Wilson asks Herbert C Hoover to take charge of food administration in America during the war
- May 20—German plot for world domination laid bare in Washington, two Chicago nurses killed by gun accident on ship bound for Europe
- May 21—Italian war mission arrives in America
- May 22—United States protests against holding of Americans in Germany, Russian peasants seize lands and burn houses
- May 23—American medical unit received by King George, United States refuses passports to Stockholm socialist conference, house passes war revenue bill calling for \$1,870,000,000
- May 24—Rear-Admiral Wm S Sims appointed vice-admiral, plan of raising \$100,000,000 for Red Cross announced
- May 25—German aircraft raid England killing seventy-six persons and injuring 174, President Wilson designates June 18-25 as Red Cross week
- May 26—Italians storm second Austrian line on Carso plateau
- May 27-28—Italian offensive on Carso plateau continues
- May 28—Minister of Finance Shingareff says Russia faces financial ruin on account of workmen's demands
- May 29—Brazilian deputies revoke declaration of neutrality
- May 31—Austrian parliament convened, many arrests made of persons opposing operation of conscription law, house defeats press censorship
- June 1—British airmen bombard Zeebrugge and Ostend, split in provisional government in Russia
- June 2—Root commission arrives in Russia.

June 3—British socialists urge peace without annexations

June 5—Military registration day under selective draft law in the United States, approximately 10,000,000 men registered

June 6—Lord Northcliffe appointed to represent Britain in America, British resume operations on Arras front

June 7—British begin great offensive at Messines, storming Wytschaede ridge and exploding great mines

June 8—Gen Pershing with staff and clerical force reaches London, force of 100 American aviators reach France, Austrian officers enter Russian lines with peace offers, Germany breaks with republic of Haiti

June 9—President Wilson's note to Russia outlining American war aims made public

June 10—British gain more ground around Messines in Ypres region

June 11—American tank steamer Petrolite torpedoed, British take German trench system on mile front east of Messines ridge

June 12—King Constantine of Greece forced to abdicate his throne

June 13—Gen Pershing lands in France; German aeroplanes raid London, killing 157 persons and wounding 430

June 14—King Constantine leaves Greece

June 15—Blockade of Greece is lifted

June 16—Italians capture Corno Cavento in the Trentino, Belgian war mission arrives in United States

June 17—Two Zeppelins raid British coast, one burned, Londoners demand reprisals for air raids

June 18—Italians advance northeast of Jamiano

June 19—Vice-Admiral Sims appointed to take temporary charge of allied naval forces in Irish waters

June 20—Canadians capture trenches before Lens

June 22—House passes food control bill, Rumanian mission arrives in America, Elihu Root speaks to large gathering in Petrograd

June 23—President Wilson appoints exports council, Canadians take German first line trenches in front of Lens

June 24—Venizelos becomes prime minister of Greece, severe report on Mesopotamian mission issued in London

June 27—American troops arrive in France; French cruiser Kleber sunk by mine, congress of soldiers' and workmen's delegates in Russia declare against a separate peace

June 28—Brazil revokes neutrality, heavy British attacks near Lens, Rumanian mission arrives in Washington

June 29—Greece severs relations with Germany and her allies

June 30—Russians open new offensive in Galicia, eighty-seven German ships seized in American ports turned over to shipping board for operation

July 1—Russians attack on eighteen-mile front in Galicia

July 2—President promulgates rules for exemptions in draft, French victory in Czerny

July 3—Russian drive at Brzezany begins; artillery battle in Ypres salient

July 4—Germans offensive south of Laon fails, France celebrates July 4, American troops parade in Paris

July 5—British attack near Ypres

July 7—German air raid on London kills and wounds many, President Wilson announces export embargo

July 8—German attack on the Chemin des Dames repulsed

July 9—President Wilson proclaims mobilization of national guard

July 11—Germans drive back British troops on the Belgian coast to the Yser, taking 1,250 prisoners, Italians occupy Dalno

July 12—Chancellor von Bethmann-Hollweg resigns

July 13—Reichstag refuses to consider war credits

July 14—George Michaelis becomes German chancellor

July 17—French take German first and second lines northwest of Verdun

July 18—Finnish diet declares for independence

July 20—Draft day in the United States, mutiny causes Russian defeat east of Lemberg

July 22—Slam declares war on Germany

July 23—Kerensky appeals to Russian army for support

July 24—President Wilson accepts resignation of Gen Goethals from shipping board, many units of Russian army refuse to fight, while the Germans sweep ahead

July 25—Allied conference begins in Paris

July 26—Death penalty restored in Russian army, German attack at Dixmude repulsed

July 27—German aeroplanes raid Harwich, United States shipping board reorganized, Germans take Czernowitz and Kolomoie

July 28—More American troops arrive in France

July 30—Heavy artillery duel in Flanders, Norwegian mission arrives in Washington

July 31—British drive in Flanders begun, extending from Warneton to Dixmude

Aug 1—Russians begin offensive in Galicia, but retreat in south

Aug 2—Germans advance in Bukovina

Aug 3—Austrians take Czernowitz, changes made in Russian cabinet, United States shipping board decides to commandeer shipping in American yards, Root mission returns from Russia, premier and nearly whole of Russian cabinet resign

Aug 5—Canadians advance on Lens, Kerensky returns to office

Aug 6—Kerensky forms new cabinet

Aug 7—Liberia declares war on Germany, Mackensen begins attack on Rumanians in Moldavia

Aug 8—Canadian senate approves conscription, Russians fall back near the Sereth river

Aug 11—Henderson leaves British cabinet

Aug 12—German aircraft raid English coast

Aug 13—Japanese mission arrives in America on war emergency business

Aug 14—China declares war on Germany and Austria-Hungary
 Aug 15—Pope's peace appeal is published, Canadians capture Hill 70, dominating Lens
 Aug 16—British and French gain on nine mile front east and north of Ypres
 Aug 19—Germans wrecking St. Quentin, Italians begin offensive on Isonzo
 Aug 20—French attack on both sides of Meuse in Verdun region, taking Avocourt wood, Le Mort Homme, Corbeaux wood, Camieres, Talon ridge, Hills 240 and 244, Mormont farm and 4,000 prisoners
 Aug 21—Canadians take 2,000 yards of German trenches in outskirts of Lens
 Aug 22—German aeroplanes raid Dover, Margate and Ramsgate
 Aug 23—Japanese mission arrives in Washington, Russians evacuate Riga
 Aug 24—Italians take Monte Santo, French take Hill 304 near Verdun
 Aug 25—French take fortified positions near Bethincourt.
 Aug 26—French take Beaumont wood from Germans, Britons win east of Marglourit.
 Aug 27—General embargo on exports beginning Aug 30 proclaimed by the president, full aid to Russia pledged by President Wilson, reply of United States to pope's peace note sent.
 Aug 28—Civilians flee from Trieste, Canadian conscription bill signed
 Aug 29—Italians gain complete control of Bainsizza plateau.
 Aug 30—President fixes price of wheat
 Sept. 1—German troops appear on Carso front.
 Sept. 2—Riga captured by the Germans, German planes raid Chatham, England, killing 107 sailors and wounding ninety-two
 Sept. 4 and 5—German aeroplanes drop bombs on American hospital camp in France, killing five and wounding ten persons, Italians take Monte San Gabriele
 Sept. 5—I. W. W. offices in many cities raided, first contingents (5 per cent) of national army go to training camps
 Sept. 7—American liner Minnehaha sunk.
 Sept. 8—State department reveals aid given by Sweden in German minister's plot in Buenos Aires to cause sinking of Argentine ships, British launch new offensive on right bank of the Meuse
 Sept. 13—State department reveals secret aid given by Swedish charge d'affaires in Mexico to Germany
 Sept. 14—Premier Kerensky proclaims Russia a republic
 Sept. 15—British advance east of Westhoek.
 Sept. 20—British advance along Ypres-Menin road to a depth of more than a mile and a half
 Sept. 21—Secretary Lansing makes public Bernstorff note asking for money with which to bribe congress, replies of Germany and Austria-Hungary to Pope Benedict's peace note made public
 Sept. 24—Price of steel cut by agreement between manufacturers and war industries board, German aeroplanes and Zeppelins raid England.

Sept. 27-28—Germans repulsed in counterattacks east of Ypres
 Sept. 28—British occupy Ramadie on the Euphrates
 Oct. 1—German air squadrons raid English coast towns
 Oct. 4—British win on an eight mile front north of Langemarck
 Oct. 5—French repulse attacks on the Aisne
 Oct. 6—Extra session of congress ends
 Oct. 7—Uruguay severs relations with Germany
 Oct. 9—Mutiny on German fleet made public
 Oct. 13-17—Germans take island of Oessel
 Oct. 13—United States destroyer Cassin damaged by torpedo, one life lost.
 Oct. 17—United States transport Antilles sunk, German raiders sink two British destroyers and eight merchantmen in North sea
 Oct. 18—Germans capture Moon island
 Oct. 23—French capture Malmaison fort and four villages
 Oct. 24—Big Austro-German drive against Italian front begun, part of Bainsizza plateau taken
 Oct. 26—Italians evacuate Bainsizza plateau
 Oct. 27—Austrian and German troops advance through Julian Alps, 2nd Italian army defeated
 Oct. 28—German-Austrian forces take Monte Santo, Goritz and Cividale, United States transport Finland torpedoed, but returns to port, nine men killed
 Oct. 29—Whole Italian Isonzo line falls, Italians retreat to the Tagliamento river
 Oct. 30—Germans and Austrians take Udine
 Nov. 1—Germans advance southeastward from Udine, British take Beersheba
 Nov. 2—American steamship Rochester torpedoed and sunk, Germans retreat from part of the Chemin des Dames, Italians abandon eastern bank of the Tagliamento river
 Nov. 3—Three Americans killed, eleven wounded and eleven captured by German trench raiding party, British attack Gaza
 Nov. 4—British advance up the Tigris
 Nov. 5—Austro-German forces cross the middle Tagliamento river
 Nov. 6—Italians abandon the Tagliamento line
 Nov. 7—Austro-Germans reach the Livenza River, British take Gaza.
 Nov. 8—Austro-German forces cross the Livenza river and outflank the Italians
 Nov. 9—Gen Armando Diaz made commander in chief of the Italian army in place of Gen Cadorna, Italians make stand on the Piave river, inter-allied military council formed
 Nov. 10—Italians yield the east bank of the Piave river, British complete conquest of Passchendaele ridge, British take Askaion
 Nov. 11—Austro-Germans take Belluno, the Vidor bridgehead and attack Italian positions in the Sette Comuni plateau
 Nov. 12—Germans and Austrians advance down the Piave to Feltré
 No 13—Austrians cross the Piave river at Zenson
 Nov 14—Americans ambush German patrol on

- French front, Austro-Germans occupy Primoland and Feltre
- Nov 15—Italians hold their positions on the Piave river, British take junction of Bear-sheba-Damascus railway
- Nov 16—Italians flood lands near Venice to stop advance of enemy
- Nov 17-18—Italians repulse attempts of enemy to cross the Piave
- Nov 18—British take Jaffa
- Nov 19—Italians attack on Asiago plateau
- Nov 20—Gen Haig starts drive on Somme front
- Nov 21—British under Gen Byng take Germans by surprise in Cambrai region advancing five miles and taking thousands of prisoners, German attacks in Monte Grappa region stopped by Italians
- Nov 22—Battle of Cambrai continues, German emissaries sent to parley with Russian peace faction
- Nov 24—Secret Russian treaties published
- Nov 25—French attack near Verdun
- Nov 26—British advance near Jerusalem, French and British infantry re-enforcements reach Italian lines
- Nov 27—Allied war conference assembles in Paris
- Nov 28—Armistice negotiations begun with Germany by bolsheviks, conference of Scandinavian rulers held at Christiania, Norway
- Nov 29—German reichstag reassembles
- Nov 30—The Germans in a determined attack drive the British back from their positions for a distance of about two miles, nearly to the Bapaume-Cambrai road, at the south end of the new British front the Germans advance through Connelieu to Gouzeaucourt, later the British retake Gouzeaucourt and LaVacquerie
- Dec 1—British succeed in regaining nearly a mile of the front lost near Gouzeaucourt, several American engineers killed in German attack
- Dec 3—London announces officially that "East Africa has been completely cleared of the enemy," every German colony is now occupied by allied forces, armistice arranged between Russians and Germans
- Dec 4—President Wilson asks congress to declare war on Austria-Hungary, Gen Dukhomin killed by bolsheviks at Mohilev
- Dec 5—Teutons launch new offensive on Asiago plateau
- Dec 6—Great disaster caused at Halifax by explosion of munitions ship, United States destroyer Jacob Jones torpedoed and sunk
- Dec 7—Congress passes resolution declaring state of war to exist between United States and Austria-Hungary, Austrians make gains on the Asiago plateau, Roumania forced to join Russia in peace parley
- Dec 8—Government in Portugal overthrown by revolution
- Dec 9—Gen Kaledines begins revolt against Russian bolsheviks, Italians check foe on Asiago plateau
- Dec 10—Capture of Jerusalem by British under Gen Allenby announced
- Dec 11—Gen Allenby formally enters Jerusalem, Japanese troops occupy terminal at Vladivostok
- Dec 12—German mass attacks near Cambrai gain 500 yards of British trenches
- Dec 14—Permanent allied naval council formed
- Dec 15—Armistice signed between central powers and bolsheviks at Brest-Litovsk
- Dec 17—Conscriptionists return to power in heavy Canadian vote
- Dec 20—Premier Lloyd George addresses parliament on Britain's peace terms
- Dec 22—German-Russian peace conference assembles at Brest-Litovsk
- Dec 23—Seventh German war loan totaled over \$3,000,000,000
- Dec 25—At peace conference Germany proposes with Russia "peace without forcible annexations and indemnities"
- Dec 28—Vice-Admiral Wemyss appointed First Sea Lord of Britain Government takes possession of railroads in United States
- Dec 17—Turkish army failed to retake Jerusalem

1918

- Jan 3—Germany refused to evacuate Russian territory
- Jan 7—Earl Reading, Lord Chief Justice of England, appointed special ambassador to the United States
- Jan 8—President Wilson addressed congress on peace, specified fourteen "rectifications of wrong and assertions of right"
- Jan 9—Conscription defeated in Australia
- Jan 10—War between Russia and Bulgaria ended, Don Cossacks proclaim republic
- Jan 12—Armistice between Russia and Germany extended one month
- Jan 14—Joseph Caillaux, former prime minister of France, arrested for treason
- Jan 16—Fuel administrator ordered industries closed five consecutive days and nine Mondays to save fuel and relieve railroad congestion
- Jan 19—Russian assembly dissolved by Lenin because of disagreement on peace, Prussian legislature reaffirms exclusive right of Emperor to make war and peace
- Jan 20—British vessels in Dardanelles destroyed German cruiser Breslau and drove Goeben ashore
- Jan 21—Economic condition in Austria leads to strong effort to end war
- Jan 23—One hundred and sixty thousand Turkish troops in Palestine desert
- Jan 25—Germany conditionally accepts four of President Wilson's war aims, rejecting ten.
- Jan 26—Fires in ship yards in Newark and Baltimore cause loss of \$2,000,000
- Jan 28—Revolution in Finland assuming serious proportions
- Jan 29—Three-fourths of Germany's troops have been sent to the western front from Russia
- Jan 30—Italians resume offensive on the Asiago front and advance their lines
- Jan 31—Serious strike riots in Germany

- Feb 2—Major-General March appointed acting chief of staff of American army
- Feb 6—Banks of the United States take issue of \$3,000,000,000 treasury certificates, Tuscania sunk, carried 2,179 American troops, 171 lost
- Feb 8—Germany announces 3,000,000 men on the western front preparing for gigantic offensive
- Feb 9—Peace treaty between central powers and Ukraine signed
- Feb 10—Bolshevik rule in Russia reported as becoming intolerable
- Feb 18—Regardless of peace negotiations, Germany resumes hostilities against Russia
- Feb 21—Bolshevik government appeals to people to resist German invasion
- Feb 27—Japan proposes joint military operations in Siberia
- March 1—Official report showed 38 per cent of Canada's 400,000 killed or wounded, killed number 40,000
- March 3—Bolshevik government signs peace at Brest-Litovsk, Russia loses Ukraine, Estonia, Lithuania, Finland, the Aland Islands and three Transcaucasian provinces
- March 5—Preliminary peace treaty signed between Roumania and the central powers
- March 6—American troops holding four and a half miles on battle front in France
- March 7—Treaty of peace signed between Germany and Finland
- March 9—Russian government transferred to Moscow
- March 10—Secretary of War Baker reached France on tour of inspection
- March 13—German troops occupy Odessa; driven out five days later
- March 14—Allies notify Holland of intention to seize Dutch ships in allied ports
- March 18—Premiers of the allies denounce "Germany's political crime against Russia"
- March 20—Holland's ships interned in allied ports seized
- March 21—Germany's most stupendous offensive begun in France on 50-mile front
- March 22—Paris bombarded from distance of 76 miles
- March 25—Germans in swift advance reach Bapaume
- March 26—Germans reach Montdidier, Pershing offers France the entire American forces in "the greatest battle in history"
- March 28—General Foch becomes supreme head of allied forces
- March 30—Anti-conscription riots in city of Quebec, daylight saving law in America became effective
- April 2—United States had loaned allies in first year of war \$5,160,600,000
- April 2—Forty thousand German troops landed in Finland
- April 4—German offensive renewed east of Amlens, allied lines hold firm
- April 5—American army at end of first year of war totals more than 1,500,000 in uniform
- April 9—German attack in west shifted north around Meuse ridge
- April 13—German troops occupy Helsinki, Finland
- April 15—Count Czernin, Austrian minister of foreign affairs, resigned
- April 18—Germans capture Meuse ridge, Bolo Pasha executed in France for treason
- April 17—Baron Burián appointed minister of foreign affairs in Austria-Hungary
- April 19—Italian army represented on French front, Lord Milner becomes British secretary of war
- April 21—Germans slow up western offensive to reform their legions, Japan agrees to loan United States \$14,000 tons of shipping
- April 22—Ireland preparing for general strike as protest against conscription
- April 23—British naval raid against submarine bases at Zeebrugge and Ostend
- April 25—Germany demands heavy concessions from Holland, announced that United States expenditures average \$35,000,000 per day
- April 28—Germans capture Mount Kemmel, southwest of Ypres
- April 27—Germans and Austrians renew Italian offensive
- May 4—Last day of third Liberty Loan The \$3,000,000,000 asked for was over-subscribed, Germans resume offensive in Flanders, with success
- May 7—British naval sortie against Germany's submarine base at Ostend
- May 27—Second great German offensive of 1918 begun on a 45-mile front in the Aisne region
- May 29—Germans had advanced ten miles over narrow area and taken twelve towns
- May 30—Soissons captured by Germans, Rheims endangered again
- June 1—Germans only forty-six miles from Paris, after gaining nine miles in one day
- June 3—Five German submarines attack United States coast and sink eleven ships
- June 5—United States marines fight on the Marne near Chateau Thierry
- June 10—United States marines capture south end of Belleau Wood
- June 22—Italians defeat Austrians on the Piave
- July 18—General Foch launches allied offensive, with French, American, British, Italian and Belgian troops
- July 21—Americans and French capture Chateau Thierry
- Aug 2—Soissons recaptured by Foch
- Aug 5—American troops landed at Archangel
- Sept. 12—Americans launch successful attack in Saint Mihiel salient
- Sept. 23—Allies cross Hindenburg line
- Sept. 30—Bulgaria surrenders, after successful allied campaign in Balkans
- Oct. 6—Germany asks President Wilson for armistice
- Oct. 8—President Wilson refuses armistice
- Oct. 9—Allies capture Cambrai
- Oct. 19—President Wilson refuses Austrian peace plea and says Czecho-Slovak state must be considered
- Oct. 23—President Wilson refuses latest German peace plea

- Oct. 27—German government asks President Wilson to state terms
 Oct. 29—Austria opens direct negotiations with Secretary Lansing
 Oct. 30—Italians inflict great defeat on Austria, capture 33,000, Austrians evacuating Italian territory
 Oct. 31—Turkey surrenders, Austrians utterly routed by Italians, lose 50,000 Austrian envoys, under white flag, enter Italian lines
 Nov. 3—Austria signs armistice amounting virtually to unconditional surrender
 Nov. 4—Allied terms are sent to Germany
 Nov. 7—Germany's envoys enter allied lines by arrangement
 Nov. 8—Kaiser Wilhelm abdicates and crown prince renounces throne
 Nov. 10—Former Kaiser Wilhelm and his eldest son, Friedrich Wilhelm, flee to Holland to escape widespread revolution throughout Germany
 Nov. 11—Germany accepts armistice terms

Some Interesting Figures. America's part in the World War is summarized in the following statement, given out by the chief of the statistical branch of the General Staff

Total armed force, including army, navy and marine corps 4,800,000
 Total men in the army 4,000,000
 Men who went overseas 2,086,000
 Men who fought in France 1,390,000
 Total registered in draft 24,234,021
 Total draft inductions 2,310,286
 Cost of war to April 30, 1919, \$21,550,000,000
 Battles fought by Americans, 18
 American deaths from battle wounds, 50,327
 American wounded, 205,890
 Deaths from disease, 53,073
 Total casualties in army, 332,132

During the war 7,450,000 men were killed, the various belligerents suffering as follows:

Russia	1,700,000
Germany	1,500,000
France	1,385,000
Great Britain	900,000
Austria	800,000
Italy	800,000
Turkey	250,000
Serbia and Montenegro	125,000
Belgium	102,000
Rumania	100,000
Bulgaria	100,000
United States	48,000
Greece	7,000
Portugal	2,000

Peace Negotiations. The collapse of Germany as a military power was accompanied by a revolution, whereby the empire was abolished and a republic was established. Kaiser Wilhelm and Crown Prince Frederick William fled to Holland, and on November 28 the emperor signed a formal document of abdication. Germany had thus fulfilled one of President Wilson's conditions, that the allies could not make peace with the

Hohenzollerns. The peace conference met in Paris in January, 1919, and German representatives signed the treaty in Versailles on June 28. For details of the conference and terms of the treaty, see **VERSAILLES, TREATY OF**

Related Articles. Various phases of the war and details connected with the subject which could not be treated in the general article may be found in the special articles listed below. The reader is also referred to the historical sections of the articles on the various countries affected by the war

CITIES

Aleppo	Constantinople	Paris
Amiens	Damascus	Petrograd
Antwerp	Fiume	Rhims
Arras	Jerusalem	Riga
Bagdad	Lemberg	Salmki
Belgrade	Leus	Sofia
Berlin	Liege	Triest
Brest	Lille	Venice
Brest-Litovsk	London	Verdun
Brussels	Louvain	Viadivostok
Bucharest	Moscow	Warsaw
Budapest	Namur	Ypres
Calais	Ostend	

RECONSTRUCTED NATIONS

Armenia	Hungary
Austria	Yugo-Slavia
Czecho-Slovak Republic	Poland

STATESMEN AND RULERS

Albert I	George, David Lloyd
Balfour, Arthur J	Gray, Edward, Sir
Bernstorff, Count	Nicholas II
Charles I	Poincaré, Raymond
Clemenceau, Georges	Tousselo, Eleutherios
Constantine I	Victor Emmanuel III
Francis Joseph I	William II
George V	Wilson, Woodrow

MILITARY AND NAVAL COMMANDERS

Beatty, David, Sir	Joffre, Joseph J
Bullard, Robert L	Kitchener, Horatio H
Foch, Ferdinand	Liggett, Hunter
French, John, Sir	Moltke
Hals, Douglas, Sir	Pétain, Henri
Hindenburg, Paul von	Perahink, John J
Jellicoe, John, Sir	Sims, William S

INSTRUMENTS OF WAR

Cannon	Poison Gas
Explosives	Submarine
Flying Machine	Submarine Mine
Howitzer	Torpedo
Machine Gun	Torpedo Boat

MISCELLANEOUS

Balance of Power	Livonia
Balkan Wars	Lithuania
Bolsheviki	Lusitania
Conscription	Mesopotamia
Courland	Nations, League of
Dardanelles	Palestine
Dobruja	Siberia
Estonia	Triple Alliance
Gallipoli	Triple Entente
Kiao-chau	Ukraine

WORMS, *wurms*, a term loosely applied to many small, rather long, creeping animals, lacking feet entirely, or having very short ones, including such various forms as the earthworm, the grubs of certain insects and intestinal parasites. The zoologist, however, confines the term to animals belonging to the branch known as *Vermes*, and accordingly he excludes the larvae of all insects. See **VERMES**.

WORMS, *wurms*, **GERMANY**, situated on the Rhine, twenty-six miles southeast of

Manz and twenty miles northwest of Heidelberg. It is an old city and contains many objects which are of interest because of their antiquity. Among these is the cathedral, which dates from the twelfth century, the Paulus Kirche, of about the same date, and a synagogue, which is still older. On Luther Platz is a monument to Luther, and it was in this city that he appeared before the diet in 1521 and refused to retract his theses (see LUTHER, MARTIN). The industries include the manufacture of textiles, leather, machinery, chemicals and chicory. Population, 1933, 51,346.

WORMWOOD, *wurm'wood*, a perennial herb native to Europe and parts of Asia, which has been introduced into the United States and Canada. The erect, hairy stem from two to four feet high, bears coarse gray leaves and small yellow flowers. From the plant is extracted a bitter oil, used in the manufacture of the French liquor called *absinthe*, and as an ingredient of various medicines. In Biblical and other literature the plant is a symbol of bitterness.

WORSTED, *woos'ted*, or *wur'sted*, a tightly-twisted woolen thread made from long-fibered wool. The name comes from Worsted, the English village where it was first made. The thread is used for knitting and for weaving cloth. See WOOL AND WOOLEN MANUFACTURE.

WOUNDS, *woonds*, injuries to any of the soft parts of the body, occasioned by external violence and attended by a greater or less amount of bleeding. Cuts, incisions, stabs and bruises are good illustrations of wounds.

Poisoned wounds are those complicated with the introduction of some poison or venom into the part. If wounds are of such a nature that the edges can be brought together closely, and if then bacteria can be kept out, healing "by first intention" takes place rapidly and with little inflammation. When wounds are deep and open, they are slower in healing. Wounds poisoned by chemicals or by bacteria are likely to be serious, and sometimes an apparently trifling injury of this sort results in death.

The first step to be taken in the treatment of any of the wounds mentioned above is to stop the bleeding by binding tight the artery or vein which has been opened. Then thoroughly cleanse the wound with warm water, removing all foreign matter, and wash with some good antiseptic, such as boracic acid

in saturated solution, a weak solution of carbolic acid, or with iodine. Finally, bandage the wound with perfectly clean gauze or light cloth. These bandages should be removed frequently, and the wound should again be cleaned, disinfected and redressed.

A fluid known as *Dakin's solution* was extensively used by French surgeons in the World War for irrigating wounds. It is a combination of chlorinated lime, sodium carbonate (dry) and sodium bicarbonate, and is an excellent antiseptic. See SURGERY.

WREN, a very active little bird, common in America, Europe and Asia. The wrens are distinguished by their small size, slender beaks, short rounded wings, brown or gray mottled plumage and erect tails. The common house wren of the United States builds its nest in boxes prepared for it, or crevices, wherever it can find them, seeming to have no fear of human beings and never hesitating to attack cats, dogs, swallows and other trespassers. The eggs are from three to nine in number and are white, dotted with salmon. The song of the wren is melodious and flute-like, and its amusing ways make it a great favorite everywhere.



WREN

It destroys large numbers of noxious insects, it is therefore a friend of the farmer and amply repays any care that may be taken of it. The largest wren in the United States is the *cactus wren* of the Southwest, the smallest is the *winter wren*, only four inches long.

WREN, CHRISTOPHER, Sir (1632-1723), one of the greatest of English architects, born in Knowle, Wiltshire. He was educated at Wadham College, Oxford, became a fellow of All Souls in 1653, was appointed professor of astronomy at Gresham College later, and afterward was elected Savilian professor of astronomy at Oxford.

There were few trained architects in England in his time, and as a scientist he was appointed one of the commissioners to restore Saint Paul's Cathedral. Before the work of restoration began the great London fire of 1666 occurred, destroying the building. Wren had been gradually drawn by consultations deeper and deeper into the problems of construction, and ultimately had become an enthusiastic student. Thus pre-

pared, the labor of building Saint Paul's devolved largely on him, and he was occupied with the work from 1675 to 1710. At the same time he made many designs for other public buildings, and in the forty years following the great conflagration there was not an important public building in London that was not designed by him.

Among the notable buildings he designed are the modern part of the palace at Hampton Court, the library of Trinity College, Cambridge, the hospitals of Chelsea and Greenwich, the Church of Saint Stephen's, Walbrook; those of Saint Mary-le-bow and Saint Michael, Cornhill, that of Saint Bride, Fleet Street, and the campanile of Christ Church, Oxford. In 1680 he was chosen president of the royal works, and from 1685 to 1700 he represented various boroughs in Parliament. Over the north doorway of Saint Paul's is a memorial tablet, on which are the well-known words, *Si monumentum requiris, circumspice* (If thou seek his monument, look about thee).

WRENCH, *wrench*, a tool designed for gripping nuts, bolts, screws or pipes so that they may be turned. A simple wrench is that used by machinists, consisting of a flat metal bar with angular openings at end and sides. Another is an *alligator wrench*, made of a single piece of metal, at one end a handle, at the other a pair of jaws, with wedge-shaped opening, one side of which is toothed. The *monkey wrench* is more complicated. A bar of metal equipped with a wooden handle is fitted with a stationary jaw and a jaw which can be adjusted to various widths by means of a screw.

WRESTLING, *wrestling*, a competitive sport engaged in by two persons, each of whom tries to throw the other prone upon the ground. Wrestling brings into play every muscle of the body, and when engaged in under the proper restraining rules is one of the most beneficial of sports. The winner in a wrestling match is usually the man who is the more skilful and alert, strength and weight count, but a quick eye and decision of action are even more essential.

Wrestling, being the most natural of sports, is among the oldest. In all Greek athletic contests it had a prominent part. The Greek wrestlers oiled their bodies, supposedly to make them more supple. Grace was insisted upon, and the most stringent rules were enforced. Roman wrestling was

of a rougher sort, in which participants were not infrequently killed. In the Graeco-Roman wrestling of modern France, the contestants are stripped to the waist and are not allowed to grasp each other anywhere below the belt or to trip each other. Most of the struggle takes place after both men are on the mat, and a fall is scored when one of the contestants forces both shoulders of his opponent to the ground.

The Irish method of wrestling is known as the *collar and elbow*. The wrestlers wear short jackets with stout collars and sleeves, to afford a good grip. Each man seizes the collar of the other with his right hand and the sleeves near the elbow with his left hand. If his grip loosens, he loses. A man is thrown when two shoulders and a hip or a shoulder and two hips touch the ground.

In England a good method of wrestling for boys and youths is known as the *black-hold catch*. Each contestant stands with his chin on the shoulder of the other, grasping the other about the body, the right arm of each under the left arm of the other. Tripping is allowed, but kicking or brutality is barred. The first step to certain success is to get the right shoulder beneath the armpit of the opponent. If a contestant loses his grip or if his shoulders touch the floor, he loses.

A freer method of wrestling, common in both England and America is the *catch-as-catch-can* method, in which, as the name implies, holds are taken at random. Tripping is permitted, but kicking and throttling are barred. Two shoulders on the floor constitutes a fall. When the match is professional, two falls in three or three in five are usually required for a decision. There are a number of recognized "holds" which give a wrestler great advantage over an opponent, such as the *grape-vine lock*, the *chancery*, the *half-Nelson* and the *hammer-lock*.

The Japanese have a system of wrestling known as *jujutsu*, which is a method of self-defense without the use of weapons. A master of jujutsu can, by a slight, swift movement, benumb an opponent's brain, dislocate his hip or shoulder or burst or twist a tendon. The police force of Japan are required to attain a certain proficiency in jujutsu, but the system in its entirety is taught to only a few men of the highest character and self-mastery. None is given the training without first taking oath not to reveal its secrets. See **JUJUTSU**.

WRIGHT, rite, CARROLL DAVISON (1840-1908), an American economist, statistician and legislator, born at Dunbarton, N. H. In the Civil War he rose from private to rank of colonel. From 1873 to 1885 he was chief of the state bureau of labor statistics, and from 1885 to 1902 was United States Commissioner of Labor. During these years he wrote many books on labor problems—among them *Some Ethical Phases of the Labor Question* and *Outlines of Practical Sociology*. In 1902 he became president of the college department of Clark University.

WRIGHT, FRANK LLOYD (1869-), American architect, was born at Richland Center, Wis. He studied civil engineering at the University of Wisconsin, but architecture became his life work. Beginning practice in Chicago in 1903, his designs at once attracted attention for their individuality and departure from conventional forms. His work was characterized as the "New School of the Middle West." He was the architect of the Imperial Hotel in Tokyo, Japan, and many buildings of note in America. He was author of numerous books on architecture and essays on the relation of art to life.

WRIGHT, HAROLD BELL (1878-), a popular American novelist, born in Rome, N. Y., and educated in the preparatory department of Hiram College, Ohio. He was at various times a painter and decorator, a landscape painter and a minister in the Disciples of Christ Church, and his first novel, *That Printer of Udell's* (1903), was written while he was preaching in Missouri. It was followed by *The Shepherd of the Hills*, a great popular success. In 1908 he retired from the ministry to devote himself entirely to writing, producing, in rapid succession, *The Calling of Dan Matthews*, *The Uncrowned King*, *The Winning of Barbara Worth*, *Their Yesterdays*, *The Eyes of the World*, *When a Man's a Man*, *The Re-Creation of Brian Kent*, *Helen of the Old House*, *The Mine with the Iron Door*, *A Son of His Father*, *God and the Grocer*, *Long Ago Told*, *Scat*, and *Ma Cinderella*.

WRIGHT, ORVILLE (1871-), and **WILBUR** (1867-1912), two brothers who won undying fame as inventors of practical flying machines. Orville was born in Dayton, O., and Wilbur in Millville, Ind. Both were educated in the public schools. They began to study aeronautics in 1886. At this time they had a bicycle shop in Dayton, Ohio.

In 1900 they began experiments in aviation with machines of their own invention and manufacture, and three years later they had produced a machine which would remain in the air over a minute. In 1905 they made the first long-distance flight, near Dayton; and in 1908 Wilbur made his first public flight in France. After the brothers had won gold medals and homage in Europe they were recognized at home, and their machine was accepted by the United States government for use in the army. The Wright machines are now rendered obsolete by new improvements. See **FLYING STORIES** OR.

WRIT, in law, a formal order issued by a court in the name of a state enjoining the person mentioned therein to perform some specified act. It is issued under seal, attested by the proper officer and addressed to the sheriff or some other officer legally authorized to enforce its execution.

The following are the writs in most common use:

A writ of summons commands an authorized officer to notify a person to appear in court to answer to a complaint.

A writ of replevin is an order permitting the recovery of goods which have been illegally seized.

A writ of mandamus is a command to a person or corporation to something pertaining to his, or its, office or duty.

A writ of quo warranto is a command to show by what right an act is performed or an office held.

A writ of error is issued to remove an action to a higher court, by reason of error in the proceedings of the inferior court.

A writ of certiorari is issued by a court of review, requiring the record of a case to be sent up from an inferior court for examination.

For writ of subpoena see **Witness**. See, also, **Habeas Corpus**, **Injunction**, **Capias**.

WRITING, signs or characters inscribed on a surface for the purpose of recording and communicating thought. The earliest form of writing, practiced by all primitive peoples, was that of picture writing, or the copying of objects direct from nature. After this came symbolical writing, such as was developed in its highest form in the cuneiform system of Western Asia and the hieroglyphs of Egypt, in which abbreviated pictures were used as arbitrary symbols, first of things and later of sounds and words. These systems marked the transition from ideographic to phonetic writing, in which signs represent either syllables or single sounds.

Of systems of writing in which signs represent syllables, the most notable is the Chinese. As the same sound may have several meanings, it is often necessary to add to a syllable some sign to indicate which meaning is intended. The Phoenicians, basing their system on the Egyptian, are said to have invented the first phonetic alphabet, in which signs represent single sounds. Tradition has it that the Phoenician system was introduced into Greece by Cadmus of Boeotia, about the seventeenth century, B. C. The Greek forms spread to Sicily and Italy, being modified as they spread.

Various systems of writing differ in the arrangement of their symbols. Chinese characters are read in columns from top to bottom. Mexican picture writing is read from bottom to top. Hebrew writing, a modification of one form of the ancient Egyptian, is read from right to left. Sanskrit, Greek, Latin and all modern European languages are read from left to right. In mediæval manuscripts a variety of styles were adopted in different epochs and countries.

Whole manuscripts were written in large or small capitals. Uncial letters, which prevailed from the seventh to the tenth century, were rounded capitals, with few hair strokes. Gothic characters, fanciful deviations from the Roman types, became common from the thirteenth to the fifteenth century. In England, in the early Middle Ages a variety of styles called Saxon prevailed, a mixed style was formed of a combination of Roman, Lombardic and Saxon characters, the Norman style came in with William the Conqueror, and the English court hand, an adaptation of Saxon, prevailed from the sixteenth century to the reign of George II.

There have been various unsuccessful attempts to introduce systems of phonetic writing, in which each sound should be reproduced by one invariable sign. Systems of shorthand are generally phonetic. See ALPHABET, HIEROGLYPHICS, SHORTHAND.

WRITS OF ASSISTANCE. In American colonial days the British customs officials were provided with general search warrants to take them in collecting import duties. These warrants were called *writs of assistance*. These writs differed from an ordinary search warrant in that they did not limit the officer's search to a specified time or place, or to specified goods, but authorized him to seize any suspected goods.

The first writ of this kind was issued in 1761 and aroused much opposition. James Otis, advocate-general of the colony of Massachusetts, resigned his office and became leading attorney in a case in opposition to the issuance of the writs. In his appeal to the court he uttered radical sentiments in opposition to the king and Parliament. The writ was declared legal, but it was rarely, if ever, used. See WARRANT.

WEYNECK, a European bird related to the woodpeckers, but, unlike the latter, unable to climb. It makes its nest in the natural cavities of trees, and lays from seven to



WEYNECK

twelve shiny, white eggs. It eats ants and other ground insects, which it captures with its bill or with its wormlike tongue. When disturbed, the bird thrusts its head out over its nest with an undulating movement, which has given it its name. Its habit of hissing on such occasions has earned for it the sobriquet *snake bird*.

WURTEMBERG, *wurt'em berK*, GERMANY, formerly a kingdom and one of the divisions of the German Empire prior to 1918, became a part of the German republic in 1919. Territorially it joins Bavaria and Baden. It has an area of 7,528 square miles, and a population of approximately two and a half million. In the Middle Ages, Wurttemberg was a county. In 1495 it was erected into a duchy and in 1806 became a kingdom. At the formation of the German Empire, in 1871, it became a part of that government. For surface, climate and products, see GERMANY.

WYANDOTTE, *wi'an dot*. See HURON. **WYANDOTTE CAVE**, *wi'an dot*, a natural cavern in Crawford County, Ind., five miles northwest of Leavenworth. It is next to Mammoth Cave in size and has been ex-

explored for about twenty-three miles. It is noted for its large chambers, some of which are 200 feet high and 300 feet broad. The stalactite formations in this cave are of unusual magnitude and beauty. Those in the room known as the Pillared Palace are of unusual interest, while Monument Mountain is a group of stalagmite columns 175 feet high.

WYOLIFFE, or **WYOLIF**, *vil'if*, **JOHN** (about 1320-1384), an English reformer, born at Hipswell, in Yorkshire, England. Of his early life we know nothing. At sixteen he entered Oxford, became a fellow of Merton College, and later master of Balliol College and warden of Canterbury Hall. He zealously applied himself to the study of the Scriptures, which he subjected to the most critical analysis, and he early manifested a skepticism in regard to ecclesiastical doctrine and discipline.

Disputes were going on at this period between Edward III and the Papal court, concerning tribute exacted from King John, and the English Parliament had resolved to support the sovereign in his refusal to submit to the vassalage. Wychiffe took a prominent part in this affair, urging King Edward to refuse the tribute to the Holy See. Pope Gregory XI, on learning of Wychiffe's defiant attitude toward the Church in regard to this matter, wrote letters to the king, to the archbishop of Canterbury and the University of Oxford, to have him tried for heresy.

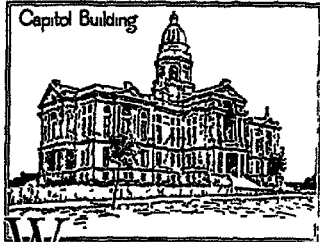
In subsequent sermons, Wychiffe attacked the higher clergy, accusing them of having assumed undue power and unbecoming arrogance. In February, 1378, he appeared before Archbishop Courtenay in Canterbury Cathedral, attended by John of Gaunt and other friends. The people who were present became so angered against Wychiffe that he and his friends had to flee for their lives. He retained the favor of the king, however, and soon afterward was awarded a professorship of divinity in the University of Oxford. In 1380 he opposed the doctrine of transubstantiation at Oxford, and two years later he was summoned to appear before a commission of bishops and doctors at London. He refused to attend, availing himself of a university prerogative. The trial was conducted without his presence. Ten out of twenty-four articles culled from his writings were condemned as heretical, and fourteen were declared to be erroneous. By

an order from the crown, he was deprived of his professorship and expelled from the university. He returned to Lutterworth, in Leicestershire, where Edward had given him a rectory. Here he labored zealously and unweariedly. Part of his time was spent in translating the Bible from the Vulgate. He continued to write unceasingly and boldly against the papal claims, upholding the Scripture itself as the highest explanation of the divine law and urging the importance of teaching it to every Christian and hence the duty of giving it to the world in the common tongue of the people. He sent out young men with the Bible, to preach the plain, straightforward word of God. These men were known as *poor priests*, and the people heard them gladly.

On Dec. 28, 1384, while hearing mass, he was seized with paralysis and died a few days later.

Wychiffe's followers were active in spreading his teachings, which for about a generation after his death acted as a powerful religious and political factor among the English people. Before Wychiffe's time there had been no systematic attempt to translate the whole Bible into English, and hence the vast importance of the version known as Wychiffe's Bible. Aside from its value from a theological point of view, Wychiffe's Bible was an important contribution to English prose.

Capitol Building



WYOMING, a northwestern state of the American Union, is located on the great Rocky Mountain plateau, and is rectangular in form, its boundaries being formed by meridians of longitude and parallels of latitude. It lies between Montana on the north and Colorado on the south, with South Dakota and Nebraska on the east and Idaho and Utah on the west. The name, meaning

large plains, was taken from that of the Wyoming valley in Pennsylvania. The word *Wyoming* is from the Delaware Indian name *Maughwauwama*. Yellowstone National Park, which with its adjoining forest reserve has an area of 5,000 square miles, occupies the northwestern corner, extending over the boundary into Idaho and Montana. Grand Teton National Park, of 150 square miles, was established in 1929. See illustration, in the article PARKS, NATIONAL. Wyoming from east to west extends 355 miles; the width is 276 miles, area, 97,914 square miles.

The People. In 1930 the population of the state was 225,565. About one-sixth of the inhabitants are foreigners, Austrians, Canadians, English, Germans, Greeks, Italians, Scotch and Swedes are the most numerous. There are about 1,150 Chinese and Japanese, most of whom are employed as laborers in the mines. The Shoshone and Arapahoe Indian reservations within the state, west of the central section, near the Continental Divide, cover an area of 960 square miles, and the Indian population is about 1,900. Nevada is the only state having a smaller population.

Surface and Drainage. The surface of the state, for the most part, is composed of mountains and plateaus. The great plains of the Mississippi valley slope away from the foothills in the east. The elevation varies from 3,500 to 13,785 feet, the highest point being Mt. Gannett. The main axis of the Rocky Mountains, which forms the Continental Divide, extends from north to south. The northern group of these mountains finds here its greatest development and is noted for its wild character and its picturesque scenery. Yellowstone National Park, 3,348 square miles in area, occupies the northwestern corner of the state. In the west central part are the Wind River Mountains, in the north central part, the Big Horn Mountains, and in the extreme northeast, the Black Hills, extending into South Dakota, in the southeast is the Laramie range, in the south, the Medicine Bow Mountains, and in the west the Teton, Gros Ventre and Shoshone ranges. The southwestern portion of the state slopes towards the Pacific Ocean and forms a part of the Grand River Valley. From the eastern and western slopes of the Rocky Mountains, several rivers take their rise, among them the North Platte, the Green, the Snake, the Laramie and the Shoshone.

Climate. Wyoming has the typical climate of the mountainous region of the northwest. The air is pure and dry, clear weather prevails and the high altitude is for many healthful. The average annual temperature is 45.5°; the mean annual rainfall, 12.98 inches.

Mineral Resources. In every mountain range of Wyoming, gold, silver, lead and copper ores are to be found, but as yet the resources have not been largely developed. Coal mining is most important, the annual output being about 8,000,000 tons, and there are over 20,000 square miles of coal lands, from which a steadily-increasing tonnage is being mined. Valuable iron deposits are found in various localities in the state. Petroleum occurs in Fremont and Natrona counties, and its production is next to that of coal in importance, in 1922 this amounted to 26,200,000 barrels. Extensive phosphate beds are found in Uinta County. The state also possesses extensive deposits of soda and an abundance of valuable building stone. Gold, silver and copper are mined in paying quantities.

Agriculture. Below the timber line, the mountains are covered with forests of coniferous trees. Between the mountain ranges are broad plateaus, with arable soils, which by means of proper irrigation yield prolific crops. On account of the slight rainfall it has been supposed that only a small part of the state was capable of cultivation. However, modern methods of moisture conservation have brought vast areas under cultivation. Irrigation ditches also have been carried long distances from the source of water supply. The result has been an immense increase in the tillable area. The raising of livestock is the most important agricultural industry. The nutritive grasses which so abundantly cover the great ranges of the pasturage support many thousands of cattle and sheep. Oats, potatoes, wheat and hay are the principal crops.

Irrigation is being largely extended. The Shoshone project, the greatest in the state, includes a remarkable dam, 328 feet high, across a narrow canyon. The dam is only 85 feet long at the bottom and 200 feet at the top. A smaller dam diverts the waters of the Shoshone River, through a tunnel 3¼ miles long, into a canal which for 40 miles passes only the upper edge of a broad and fertile valley containing 150,000 acres. Near

Douglas, in Converse County, and in Natrona, Johnson and Sheridan counties there are large irrigated areas

Manufactures As Wyoming is an agricultural and mineral state and still in the first steps of material development, it has no distinctive manufacturing interests. The most important manufacturing industry is car construction and railway repair, and next in importance is the manufacture of lumber and timber products.

Transportation The principal railroads are the Union Pacific, the Chicago, Burlington & Quincy and the Chicago & North Western. The total operative mileage is over 2,000.

Government The legislature has a senate of 27 members, elected for four years, and a lower house of 62 members, elected for two years. The sessions are biennial, and are limited to forty days. The executive department consists of a governor, a secretary of state, an auditor, a treasurer and a superintendent of public instruction, each elected for four years. The courts consist of a supreme court, consisting of a chief justice and two associates, and such inferior courts as the legislature may establish.

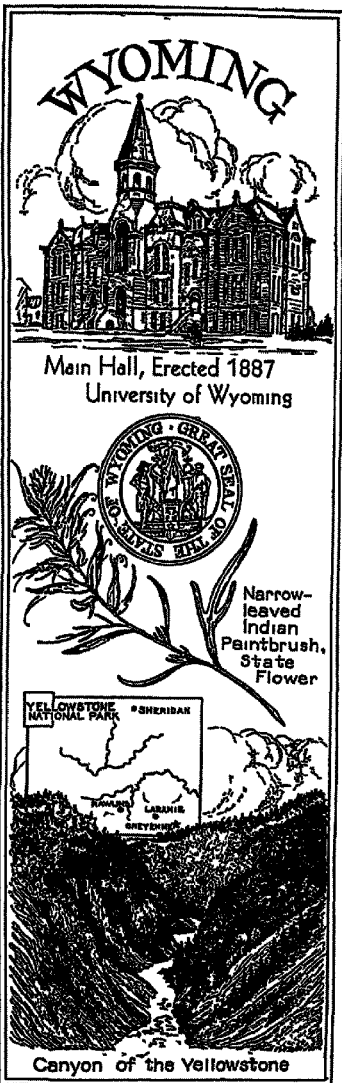
Education The University of Wyoming, chartered in 1886, is situated at Laramie and is the leading educational institution. The expenses of the public school system are provided for in part by the rental of government lands which are set aside for school purposes. The total extent of lands which may be so used is 3,600,000 acres.

The state school system is in charge of a State Board of Education, with a commissioner, elected by the board, as the executive officer. There is a state superintendent of public instruction, who is a member of this board, but his relation is chiefly advisory.

Institutions There is a soldiers' home at Buffalo, a hospital for the insane at Evanston, a school for defectives at Lander, an industrial institute at Worland and a state hospital at Rock Springs. The penitentiary is at Rawlins. At Thermopolis there is the Big Horn Hot Springs Reserve.

Cities The chief cities are Cheyenne, the capital, Casper, Laramie, Sheridan and Rock Springs.

History Wyoming was a part of the territory included in the Louisiana Purchase of 1803, with the exception of the southwest corner, which was a part of the territory ac-



Items of Interest on Wyoming

Wyoming is governed under a constitution adopted in 1890

Amendments if agreed to by two-thirds of the members of each branch of the legislature are submitted to the electors of the state at the next general election

About one-eighth of the land area is devoted to farms, but the improved land is only two per cent of the total area. Wyoming has over 30,000,000 acres of unreserved land.

There are two soda lakes in the state. In the summer the soda hardens and is cut into blocks three or four feet thick

Wyoming's rivers are much frequented by anglers in search of rainbow trout. Specimens weighing from eight to ten pounds are found in the Big Laramie River.

The Yellowstone region is described in Washington Irving's *Captain Bonnaville*, the hero being one of the early traders

In 1935 hanging in capital crimes was abolished in favor of lethal gas. Social security laws of advanced type have been passed

Questions on Wyoming

What is the peculiar feature of the boundaries of Wyoming? Do the boundaries of any other state have a similar feature?

What does the name *Wyoming* mean? Is the name appropriate to the state?

What great river systems have tributaries in Wyoming?

What region within the state has a world-wide reputation because of its scenery?

What part of the state has the largest number of inhabitants? Why?

Locate the Indian reservations on the map. How many are there?

Why is Wyoming one of the leading wool-producing states?

What are the most important mineral productions?

Why is the mining industry not more fully developed?

Why are there not more railroads?

quired from Mexico in 1848. The first white man supposed to have visited the region was Sieur de la Verendrye, in 1734. He was seeking sites for fur-trading posts. White hunters visited the Yellowstone region in 1807, and from that time hunters began to traverse the territory.

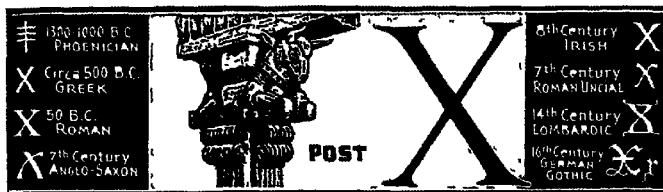
The first permanent settlement was made at Fort Laramie in 1834. Most of the immigration to California and Oregon passed through the territory, but not until the completion of the Union Pacific Railroad in 1869 were settlers attracted to the country. The Indians were hostile, and long before the construction of the railroad the government had built a chain of forts for the protection of immigrants. The discovery of gold in 1867 increased the number of settlers, and in 1869 Wyoming became an organized territory. Yellowstone National Park (which see) was created in 1872. Wyoming was admitted into the Union as the forty-fourth state on July 10, 1890. From the organization of its first government the state has given women equal suffrage with men. From this practice it received its popular name **THE EQUALITY STATE**.

Related Articles Consult the following titles for additional information.

Bighorn River	Sheridan
Black Hills	Snake River
Cheyenne	Yellowstone National Park
Laramie	
Rocky Mountains	Yellowstone River

WYOMING UNIVERSITY OF, a coeducational state institution, founded at Laramie in 1886. It comprises colleges of liberal arts, agriculture, engineering and education, departments of music, home economics, commerce and university extension, a teachers' training high school and a summer school. The Wyoming state normal school is maintained as a part of the college of education, and the agricultural experiment station is operated in connection with the agricultural departments. There is a faculty of about 200, and a student enrollment of over 3,000. The library contains 97,000 volumes.

WYOMING VALLEY MASSACRE, a fearful massacre in Wyoming Valley, Pa., on July 3 and 4, 1778, perpetrated by an English and Indian force against the American settlers of the valley. A vast majority of the inhabitants, including women and children, were slain in the course of two days' slaughter, and the rest fled eastward to the nearest settlements. The valley was not settled again for several years.



X, the twenty-fourth letter of the alphabet and the representative of what might as well be denoted by *ks* or *gs*. The letter *x* was originally Phoenician, and until a late date the last in the Roman alphabet, but *y* and *z* were finally added from the Greek. As an initial letter, it is pronounced like *z*.

In algebra, *x* is the usual symbol for the unknown quantity. In Roman numerals **X** signifies ten, perhaps from the fact that it represents a **V** standing upon a second **V** inverted.

XANTHIPPE, *xan·thip'pe*, the scolding wife of the philosopher Socrates, whose forbearance with her quarrelsome temper was a salient trait in his character. The name has become proverbial as that of a scolding shrew.

XAVIER, *sav'ee er*, FRANCISCO DE (1506-1552), better known as SAINT FRANCIS XAVIER, was a Jesuit missionary in Asiatic countries, earning the title "Apostle of the Indies." He was a native of Northern Spain, the son of a nobleman whose family seat was Xavier. He was sent to Paris to be educated, and with Loyola he founded the Society of Jesus. In the early part of 1540, he was chosen for the mission to India. From Goa, where he arrived in May, 1542, he extended his labors southward to Ceylon, Malacca and Celebes. He spent two years in Japan and returned to Goa to organize a mission to China, but before he could overcome the difficulties in his way, he died. Xavier was canonized in 1622.

XENIA, *se'ns ah*, OHIO, the county seat of Greene County, fifty-five miles southwest of Columbus, on the Little Miami River and on the Baltimore & Ohio and the Pennsylvania railroads. There is no airport. The city is in a productive farming region. There are extensive cordage works, shoe factories, machine shops and rubber and candy fac-

toories. The Xenia Theological Seminary and the Ohio soldiers' and sailors' orphans' home are located here. A courthouse, a Carnegie Library and a Federal building are prominent features. Wilberforce University for colored students is located three miles north. There are interesting Indian mounds and relics in the vicinity, as in other nearby sections of the state. Xenia was settled in 1803, and was incorporated five years later. Population, 1929, 9,110, in 1930, 10,507, a gain of 15 per cent.

XENOPHON, *sen'o fon* (about 454-about 355 B. C.), an Athenian historian and general, a pupil of Socrates. When about forty years of age, he joined the expedition of Cyrus against Artaxerxes. Cyrus was killed in the Battle of Cunaxa, and the Greek generals were put to death. The ten thousand mercenaries then chose Xenophon as their leader, and he brought them out of the strange country to the Black Sea. On his return to Greece he fought with Sparta against Athens.

Xenophon wrote numerous works, and all of these, it would seem, have come down to us. The chief are a famous work called the *Anabasis*, which describes the expedition of Cyrus already referred to, especially the retreat of the Ten Thousand, the *Memorabilia*, a record of the life and teachings of Socrates, the *Hellenica*, which gives a somewhat dull account of forty-eight years of Greek history and is a continuation of the history of Thucydides, and several minor works. Xenophon's writings are clear and accurate, and are among the best sources of information regarding some of the most important events that have ever happened, but his style is often commonplace and monotonous.

XERXES, *sark'sees*, the name borne by three kings of Persia, the most celebrated of whom was Xerxes I (see next page).

Xerxes I, the son of Darius I, succeeded to the throne of Persia on his father's death, in 485 B C. After suppressing a revolt in Egypt, he began to make plans for the invasion of Greece, the preparations for which had been begun by his father. These preparations were on the most enormous scale. Provisions were stored up on the intended route for three years, a transport fleet was collected, the engineering skill of the day was exerted to remove land obstacles and the resources of the vast Persian Empire were taxed to the utmost to produce an armament sufficient to crush Greece. According to ancient computation, the invading army numbered over two million, and although this, possibly, is an exaggeration, it must have been numerically the greatest army on record.

At the head of his enormous host, Xerxes advanced unopposed till he came to Thermopylae, but here his fleet was seriously damaged by a storm, while the narrow pass was effectually held by Leonidas, at the head of a determined, though small, band of Spartans. At last the passage was effected through treachery, and Xerxes marched on through Phocis and Boeotia to Athens, which he entered without opposition. In the meantime the Persian fleet had met with several mishaps. In two engagements with the Greek ships at Artemisium, it had suffered considerable damage, and a storm which occurred between the two conflicts was the cause of still greater loss. Finally, at Salamis (480 B C) a naval battle was fought, one of the most decisive in the history of the world, in which the Persians were defeated with terrible loss. Xerxes, who from a lofty eminence had watched the destruction of his fleet, fled panic-stricken to Sardis, leaving in command of his army, Mardonius, who was defeated the following year at Plataea. He spent the rest of his life in obscurity and was murdered by Artabanus, the commander of his bodyguard, who was plotting to make himself king of Persia. He was succeeded by his son Artaxerxes I.

Xerxes II was the son of Artaxerxes I. He was born about 450 B C and lived twenty-five years. On the assassination of his parents he ascended the throne but was murdered about a month later.

The third Persian ruler of this name, who was also called OARSES, ruled about 337 B C.

X-RAY. See ROENTGEN RAYS.

XYLOPHONE, *si'lo fone*, a musical instrument. Small bars of wood, selected for



XYLOPHONE

their sounding quality, or pieces of metal of graduated length are fastened upon a horizontal frame in such a manner as to form the chromatic scale. The performer plays with two small mallets, one in each hand.

X Y Z CORRESPONDENCE, the name given to the dispatches sent in 1797-1798 to the United States government by its commissioners, Charles Pinckney, John Marshall and Elbridge Gerry, in Paris. These men were sent to France to settle certain difficulties with that government. On their arrival they were not received officially, but were compelled to communicate with the government through three agents, who informed them that the first step toward negotiation would be the payment of a large sum of money to the Directory, which was then in control of French affairs. The American commissioners, with the exception of Gerry, promptly withdrew and transmitted the correspondence to President Adams, who, in turn, laid it before Congress, substituting for the names of the French commissioners the letters X Y Z. The correspondence aroused the bitterest feeling in the United States, and a naval war with France was actually begun, but the French government receded from its position and thus averted a struggle. See ADAMS, JOHN.



Y, the twenty-fifth letter of the English alphabet, resembling in its form the Greek upsilon. It is, like *w*, both a consonant and a vowel, but it differs from *w* in that it is often used by itself as a vowel, as in *by*, *deny*, *pony*. In this use it is superfluous, as it might be replaced by *i*.

In algebra, *y* stands for the second of the unknown quantities.

YABLONOI, *yah blo noi*, **MOUNTAINS**, a Siberian range extending from Northern Mongolia in a northeasterly direction about 1,000 miles and merging with the Stanovoi. The highest peaks, at the southern end of the range, attain an altitude of more than 8,000 feet. Many other peaks are 6,000 feet high.

YACHT, *yot*, and **YACHTING**, *yot'ing*. A sailing boat, used for pleasure, for traveling or for racing, is known as a yacht. There are three principal rigs for sailing yachts—cutter, schooner and yawl. A cutter has one mast and a running bowsprit and usually carries four sails, namely, mainsail, gafftopsail, foresail and jib. A square sail is also frequently set by the larger vessels of this class. A schooner has two masts, mainmast and foremast, a standing bowsprit and jib-boom, or not infrequently, instead of these, a running bowsprit, like that of a cutter. A yawl is rigged exactly like a cutter, with the addition of a small mizzenmast. It is a very convenient cruising rig and is becoming common for yachts of over 50 tons. Steam yachts are common, and in many localities they are put to practical uses by their owners. The speed attained by some is remarkable.

The history of yachting is the history of yacht racing, inasmuch as competition improved yachts, just as horse racing improved the breed of horses. Very arbitrary rules obtain with reference to the building of yachts for racing purposes. The first international contest between the United States

and England took place in 1851, when the *America* defeated fifteen English yachts in their own waters, and won the \$500 cup offered by the Royal Yacht Squadron. The trophy has remained ever since in the possession of the New York Yacht Club, though several English yachts have tried to win it back. In 1870 the *Cambria* was defeated. In 1885 the *Genesta* was defeated by the *Puritan*, and a year later the *Galatea* by the *Mayflower*. The *Volunteer*, the *Defender*, the *Reliance*, the *Resolute* and the *Enterprise* are American yachts that have more recently maintained supremacy over the English challengers.

The principal English competitors since 1899 have been vessels constructed for the purpose by Sir Thomas Lipton and named respectively the *Shamrock I*, *II*, *III*, *IV* and *V*. The races are usually sailed off Sandy Hook, a few miles south of New York harbor. In 1920, the *Resolute* defeated *Shamrock IV*, and in 1930, *Shamrock V*, Lipton's last challenger, was defeated by the *Enterprise*. See **SAILBOAT AND SAILING**.

YAK, an animal of the ox tribe, found only in Tibet, Asia. It is found wild and is the ordinary domestic animal of the inhabitants of that region, supplying milk, food and raiment, as well as serving as a beast of burden. The size is that of a small ox. The horns are long, nearly cylindrical, smooth and pointed at the ends, and they have a peculiar and characteristic curve. Some of the domestic yaks are hornless. Their most remarkable external characteristic is the excessive growth and peculiar distribution of the hair.

The upper parts of the body and sides are clothed with thick, soft, woolly hair, more fully developed along the middle of the back, especially on the shoulders, where it forms a great bunch. From the upper parts of the

limbs and the whole of the lower surface of the body hangs a thick growth of long, straight hair, in old animals sweeping the ground and almost concealing the somewhat short legs. The tail is profusely covered with a thick mass of such hairs. The wild animals are nearly uniformly black, the domestic yaks are often quite white. The silky and tough hair and the skins are often used in the manufacture of caps, coats, blankets and ropes.

YAKIMA, *yak'he mah*, an Indian tribe, formerly living on both sides of the Columbia River and on the northerly branches of the Yakima in Washington. They were mentioned by Lewis and Clark in 1806. In 1855 the United States made a treaty with the Yakima and thirteen other tribes whereby they were required to cede valuable lands to the government and confine themselves to the Yakima reservation. The Indians resorted to war, and it was not till 1859 that the provisions of the treaty could be carried out.

YAKIMA, WASH., the county seat of Yakima County, is on the Yakima River and the Northern Pacific and Union Pacific railroads, and an interurban road, and is about 200 miles southwest of Spokane. There is a county airport. It is a distributing center for a large surrounding territory. It has extensive fruit canneries, flour mills, sawmills, other wood-working factories and warehouses. There is a fine Federal building, a Carnegie Library, a state armory, and a hospital. The state fair is held here. The commission form of government is in operation. The name was changed from North Yakima in 1917. Population, 1930, 22,101.

YALE UNIVERSITY, a foremost American institution of higher learning, and the third in point of age, as its establishment followed the founding of Harvard and of William and Mary. It is located in New Haven, Conn., and is the outgrowth of a small college founded in 1701 at Saybrook by ten ministers of the colony of Connecticut. In 1716 it was removed to New Haven, where it was permanently located, and two years later it was given the name of Yale College in honor of Elihu Yale, who bestowed upon it a sum of money.

The beginning of the present organization dates from the administration of Timothy Dwight, who was president from 1795 to 1817. During this time, permanent professorships were established, the college grounds were

extended and professional schools were planned, but only the medical school was established. President Dwight's successors continued his plan and the other professional schools were organized as rapidly as funds could be provided for their maintenance. In 1837 the state legislature authorized the adoption of the name Yale University.

As now organized, Yale has nine departments of instruction, each under the supervision of a special faculty. They are the College, which confers the degree of Bachelor of Arts; the Sheffield Scientific School, giving both graduate and undergraduate courses, the Graduate School, conferring the degrees of Ph. D. and M. A.; the Medical School, the School of Religion (undenominational), the School of Law, the School of Fine Arts, the School of Music; and the School of Forestry, a graduate department giving the degree of Master of Forestry. At Keene, N. H., there is a school forest of 1,000 acres.

The university is not coeducational, and it lost heavily because of enlistments after America entered the World War. Ordinarily there are about 5,000 students and over 700 instructors. There are about 1,700,000 volumes in the libraries. Among the notable structures are the observatory buildings, the gymnasium, and the Yale "Bowl," one of the largest football amphitheaters in the world. Many eminent men are among the alumni of Yale, including Nathan Hale, Jonathan Edwards, Lyman Beecher, James Kent, John C. Calhoun, Eli Whitney, Samuel F. B. Morse, Noah Webster and William H. Taft.

Elihu Yale (1648-1721), an English merchant and philanthropist, was born near Boston. His father was one of the original settlers of New Haven, Conn. The son was educated in England and began his career as a merchant, engaging in trade in India. From 1687 to 1692 he was governor of the East India Company's fort at Madras. He then returned to England. Mr. Yale became interested in the schools founded at Saybrook and afterwards located at New Haven, Connecticut. During his life he made several bequests to this institution, and in 1718 he announced a large gift. The trustees then honored him by naming the school Yale College.

YALU, *yah loo'*, **RIVER**, a river of Eastern Asia, which rises on the eastern borders of China and flows southwestward and south

ward, forming during its entire course a part of the boundary between China and Chosen (Korea). Its length is about 300 miles, and it is navigable for about thirty miles. At the mouth of this river a famous naval battle was fought in 1894, during which the Japanese destroyed the Chinese fleet. The forcing of the passage of this river at its mouth by the Japanese in 1904 was the first movement in the land operations of the Russo-Japanese War. Since the Japanese annexed Chosen they have called the river *ORYOKU* (*o ri o'ku*). See RUSSO-JAPANESE WAR.

YAM, a plant having edible roots much like the sweet potato. It is found in the temperate and subtropical parts of America, in China



YAM

and in the islands of the Southern Pacific. In Australia and China a species known as *winged yam* produces edible tubers from one and a half to three feet long which sometimes weigh thirty pounds. The skin is dark brown and the reddish flesh is sweet and juicy and very palatable when baked. A large yam is also found in India, though there the small white yam is more in demand for food.

The yam has become an important vegetable in the United States. While it contains less starch than the Irish potato, it contains more nitrogen and a high percentage of sugar.

YANCEY, *yaw'sy*, **WILLIAM LOWMYER** (1814-1863), an American publicist and orator, born in Georgia. He studied law, was admitted to the bar in 1834 and practiced law, at the same time editing a Unionist paper. He removed to Alabama in 1836, became prominent as a lawyer and Whig orator and entered the legislature. Elected to Congress in 1844, he espoused the Southern cause, and after his retirement two years later he became the recognized leader and orator of the radical element in the South.

In the convention which met at Montgomery, Ala., January 7, 1861, he reported the ordinance of secession. He went as a Confederate commissioner to seek European recognition of the independence of the Confederacy, but was unsuccessful. After his return he served in the Confederate Senate until his death. Yancey, though he held office for only two brief periods, was one of the most influential orators of the Civil-War period and did perhaps more than any other man to strengthen among Southerners the desire for secession.

YANG-TSE, *yahng'tse*, one of the largest and most important rivers of Asia. It rises in the south-central part of the continent, in the plateau of Tibet, flows north-eastward, then southeastward, then north-eastward, after an irregular course, it enters the Yellow Sea through an estuary about thirty miles wide. Its length is about 3,000 miles. The upper part of the course is between mountains, and the channel is narrow and the stream rapid, often interrupted by rapids and falls. The tide ascends the river for 450 miles, and it is navigable for 600 miles into China.

The chief tributaries are the Han, from the north, and the Wu, the Heng and the Kan, from the south. Some of these are navigable for considerable distances. The Yang-tse brings down large quantities of sediment, and it is estimated that the amount deposited each year is equal to about five-sixths of the amount deposited by the Mississippi. It is connected with the Hwang by the Grand Canal.

YANKEE, in America, the popular name for a New Englander; in Great Britain it is often applied indiscriminately to the whole population of the United States, and during the World War it was the common designation of the American soldier, regardless of his state. In its origin it was a corruption of the

word *English* as pronounced by the Indians. It seems to have been first applied about 1776 by the British soldiers as a term of reproach to the New Englanders, who themselves afterward adopted it. Since the Civil War the Southern people have applied it to all people of the North.

YANKEE DOODLE, a national song of the United States, sung to a very old tune, which dates from the tenth century. The words, which are mere doggerel, were probably written at the time of the French and Indian War by an English army surgeon, Dr. Richard Schneckburgh, in derision of the ill-trained continental troops. Notwithstanding its mockery, it was taken up by the "Yankee" soldiers and became widely popular.

YANKTON, S. D., the county seat of Yankton County, sixty-five miles southwest of Sioux Falls, on the Missouri River and on the Great Northern, the Chicago, & North Western and the Chicago, Milwaukee & Saint Paul railroads. The city is the center of a large agricultural and stock-raising district. Its manufactures include flour, cement, bricks and cigars. There are two nurseries. The Yankton College (Congregational) is located here; also the state hospital for the insane. Other notable institutions and buildings are the Sacred Heart Hospital, a Federal building and a Carnegie Library.

Yankton is the oldest settled community in the Dakotas. It was settled in 1858 and was the capital of Dakota Territory until 1883. It adopted the commission form of government in 1910. Population, 1920, 5,024; in 1930, 6,072, a gain of 20 per cent.

YAQUI, *yah'ke*, **INDIANS**, a native tribe of the Mexican state of Sonora, numbering about 20,000 and representing a well-developed type of civilization. They are said to be the only Indian tribe that has never been fully subdued by the white man. They made a treaty with the Spaniards in 1610, but their history from 1740 down to the present has been a series of revolts. In 1906 the Mexican government took the extreme measure of attempting to subdue them by deportation to Yucatan. The industries of the Yaquis are agriculture, cattle raising and the manufacture of cotton and woolen stuffs. They also make hats of palm leaves and baskets of reed. Many are employed as laborers in fields and mines.

YARKAND, *yahr kahnd'*, a city situated in the chief oasis of Sin Kiang (Western

China), southeast of Kashgar. It is at an elevation of over 3,800 feet, is enclosed by a wall and surrounded by a moat. The buildings are constructed of stone and clay, and most of them are of one story. The city has numerous bazaars, mosques and caravansaries. It is also the seat of some Mohammedan colleges. It is surrounded by an agricultural and stock-raising region and carries on a trade in silk, dyes, leather, wool, tea and sugar. Yarkand is not so important a commercial center as formerly, owing to the fact that railway lines elsewhere have diverted much of its caravan trade. Population, about 70,000.

YARMOUTH, *yahr'muth*, **NOVA SCOTIA**, the county seat of Yarmouth County and an important seaport, situated on a small bay of the Atlantic Ocean, 205 miles southwest of Halifax. It is served by the Canadian National and Dominion Atlantic railways. It has regular steamship connection with Boston, Halifax and Saint John. Its commercial prestige is due largely to its fisheries and fish preserving industries and its lumber trade. Strawberry growing and fur farming are carried on. Excellent roads make this a popular center for tourists, and also for sportsmen. Fish and game are plentiful.

Yarmouth was founded in 1861, and was incorporated as a town in 1890. It is a city of beautiful homes, fine streets and attractive surroundings. Population, 1921, 7,073, in 1931, 7,055.

YARMOUTH, or **GREAT YARMOUTH**, **ENGLAND**, a seaport and watering place situated on the east coast, nineteen miles east of Norwich. The town occupies a narrow peninsula between the Yare River and the North Sea, and is connected by bridges with Suffolk and other places on the right bank of the Yare. The river is lined with extensive piers. Yarmouth is an important commercial port, and is the chief center of the herring fisheries of England. Other industries include shipbuilding and the manufacture of ropes, nets and sails. Dickens has described the salty, fishy air of Yarmouth and the charm of its seafaring folk in his novel, *David Copperfield*. Population, 1931, 56,769.

YARN, thread made by twisting the fiber of wool, cotton, flax, silk, hemp or other materials. The yarns are woven into fabrics, or used in knitting, embroidering and sewing. For the process of making yarn, see **SPINNING**.

YATES, RICHARD (1818-1873), an American political leader, born in Warsaw, Ky, but taken in childhood to Springfield, Ill. He graduated at Illinois College, Jacksonville, and began the practice of law at Springfield, where he became a prominent Whig. He was elected to the state legislature, serving from 1842 to 1849, and he was a member of Congress from 1851 to 1855. He became a Republican at the organization of the party and was elected governor of Illinois in 1860. During five years' service, he gained fame as one of the greatest of the war governors and was a close friend and adviser of President Lincoln. In 1865 he was elected to the United States Senate, where he served one term. His son, Richard Yates (1860-1936), was governor of Illinois from 1901 to 1905, and in 1918 was elected a member of Congress from Illinois.

YAZOO, a river of Mississippi, formed by the junction of the Tallahatchie and the Yalabusha. It has a winding course to the south and southwest and enters the Mississippi about five miles above Vicksburg. Its length is 300 miles, and it is navigable for steamboats throughout its course. The name is an Indian word meaning *river of death*.

YEAR, the period of time during which the earth makes one complete revolution in its orbit, or the period which elapses between the sun's leaving either equinoctial point, or either tropic, and its return to the same. This is the *tropical*, or *solar*, year, which is the year in the strict and proper sense of the word. This period comprehends what are called the twelve calendar months, and it is usually considered to commence on January 1, and to end on December 31. It is not quite uniform, but its mean length is 365 days, 5 hours, 48 minutes and 46 seconds. In popular usage, however, the year consists of 365 days, and every fourth year of 366. The extra day is always added to February, and the fourth year is called *leap year*. The *sidereal* year consisting of 365 days, 6 hours, 9 minutes and 9 seconds, is that used in astronomical calculations.

Related Articles. Consult the following titles for additional information:
 Calendar Precession of
 Equinox the Equinoxes
 Leap Year Seasons

YEAST, *yeast*, the ferment used in bread-making and in brewing, composed of a mass of small one-celled yeast plants. These cells are so small that 3,000 of them, laid end to

end, would scarcely measure an inch. Under favorable conditions they multiply very rapidly, breaking up the sugar in the substance upon which they feed, setting free carbonic acid gas and forming alcohol. Yeast manufactured for commercial purposes may be liquid, dry or compressed in form.

Related Articles. Consult the following titles for additional information:
 Bread Fermentation
 Brewing

YEATS, yates, WILLIAM BUTLER (1865-), an Irish poet and dramatist, born in Dublin, the son of a distinguished artist. At an early age he turned his attention to literature, and became a leading figure in the Irish literary revival. With Lady Gregory he helped to establish the Irish Literary Theater, from which the Irish National Theater Society developed. He made lecture tours in the United States and Canada in 1903 and 1914. Yeats' peculiar gifts as a dramatist are conspicuous in *Cathleen ni Houlihan*, *The Pot of Broth*, *The Hour Glass*, *Deirdre* and *The Land of Heart's Desire*. His verse is of the highest lyrical quality, and possesses the same sort of elusive charm that is found in his essays and plays.

YEDDO, JAPAN. See TOKYO.

YELLOW, one of the three primary colors. Lemon and canary yellow may be taken as pure yellows. Chrome yellow has a slight orange tint. A peculiarity of yellow is that an increase of light seems to strengthen the color, and that the color is also greatly intensified when placed beside its complementary color, blue. Moreover, it reciprocally intensifies the blue. Yellow is the national color of China.

YEL/LOWBIRD. See AMERICAN GOLD-FINCH.

YELLOW FEVER, an infectious and highly fatal disease of the warm regions of America and Africa, communicated to the human system by the bite of a species of house mosquito. The disease was first recognized in 1647 in the West Indies. In 1691 there was a disastrous epidemic of it in Barbados. In 1878 a severe visitation of the disease in the lower Mississippi valley killed about five thousand persons in New Orleans and Memphis alone. Since the occupation of Cuba and the Canal Zone by the United States, the disease has been practically stamped out in those regions. Proper sewerage, disposal of garbage, isolation of patients and their protection by screens from mosquito bites, dis-

infection of buildings in which cases occur and the destruction of the breeding places of the mosquitoes themselves have proved effective methods of combating the disease.

Yellow fever is so called because the skin of its victims takes on a yellow hue owing to jaundice which spreads over the whole of the body. The onset of the disease takes place three or four days after infection, and is usually characterized by severe chills or rigors. Temperature rises rapidly, and may reach 105° or even higher. In favorable cases the fever abates at the end of the fourth day, and with rest and careful feeding recovery may be complete in two or three weeks. In severe cases blood may be discharged from the bowels and there may be bleeding of the nose or gums. Delirium sets in, and the patient lapses into unconsciousness. Death is due to hemorrhage, heart depression, suppression of the urine or the direct action of poisons upon the vital centers. See MALARIA.

YELLOW-HAMMER, one of the numerous names of the American golden-winged woodpecker, or flicker. In England the name is applied to the yellow bunting. This bird is bright yellow, with patches of brown. The wings are black, bordered with gold. The bird builds in hedge-rows, the eggs are spotted with red. See FLICKER.

YELLOW JACKET, the common name for any wasp whose body is marked with yellow. See WASP.

YELLOWLEGS, an American snipe found in marshes and along shores. It is black and white on head, breast and back, and light underneath. It nests in Canada as far north as the Arctic Circle, laying three or four buff-colored eggs in a depression of the ground. In winter the birds migrate as far south as Argentina, traveling a distance of eight thousand miles twice yearly—the longest migratory flight made by any bird.

YELLOW RACE. See MONGOLIAN RACE.

YELLOW SEA, an arm of the Pacific Ocean, invading the continent of Asia 600 miles, between China and Chosen (Korea). It is connected with the Japan Sea by the Chosen Strait. Its greatest width is 300 miles; its greatest depth, 300 feet. The northern projections form the Chosen, Liao-tung and Pe-chi-li gulf. Of the rivers flowing into it the largest are the Hwang, the Liao and the Yalu, the latter now known as the Oryoku. The large quantities of yellow mud

deposited in it by inflowing streams have given this sea its color and its name.



YELLOWSTONE NATIONAL PARK, America's most celebrated wonderland, containing the greatest geyser region in the world, situated in the northwestern corner of Wyoming, extending over the western and northern boundaries a distance into Idaho and Montana. The park was set apart in 1872 for "the benefit and enjoyment of all the people," and it was the first region thus dedicated by the government. It has a length from north to south of sixty-two miles and a width from east to west of sixty-four miles, and its area of 3,348 square miles makes it about two-thirds the size of Connecticut. On the north and west it includes narrow strips of land from Montana and Idaho, respectively. In 1891 a forest reserve, lying to the south and east of the park, was created by Presidential proclamation and placed under the control of the park authorities. The total area of the two reservations is about 5,500 square miles.

Surface. The central portion of the park consists of a broad plateau, ranging in altitude from 7,000 to 8,500 feet. This plateau is bordered by a number of mountain ranges, in which peaks rise to a height of 11,000 to 12,000 feet. Of these the most important ranges are Absarokas, on the east; the Snowy Mountains, on the northeast; the Gallatin Range, on the north and west, and the Tetons, on the south. The loftiest mountain in the park is Electric Peak, which has an altitude of 11,155 feet. The highest land in the vicinity is Mount Hayden, more commonly known as the Grand Teton, the highest peak of the Teton Range, having an altitude of 13,671 feet. This stands on the south of the park, just a few miles beyond the boundary.

The mountains are separated from one another by broad plateaus or valleys, and the intermingling of these features gives a diversity to the scenery which is remarkably pleasing. The great valleys are Junction Valley, on the east, which, with its branches, includes the Yellowstone and the Lamar rivers; Hayden Valley, occupying an important tract along the Yellowstone River between Yellowstone Lake and the Great Fall;



Travel Magazine—DeCen from Deane Galloway

**THE GIANT GEYSER EACH ERUPTION THROWS A STREAM OF WATER
250 FEET HIGH FOR NINETY MINUTES**

YELLOWSTONE NATIONAL PARK 3963 YELLOWSTONE NATIONAL PARK

the Madison Valley and its extensions, through which flow the Firehole and Gibbon rivers, and in which are located the geyser regions; Swan Lake Flats, Willow Park, the Shoshone and the Paul's River basins.

Rivers The Yellowstone National Park is drained into three river systems, the Yellowstone, the Missouri and the Snake. The first two find an outlet on the Atlantic slope, while the third reaches the Pacific. The rivers flowing into the Missouri are the Madison, formed by the Gibbon and the Firehole, and the Gallatin. These drain the northwest and west central portions of the park. The southwestern and most of the south central portions are drained into the Snake River, and thence into the Columbia. The eastern and southeastern portions are drained into the Yellowstone, and thence into the Missouri. Between these river systems the Continental Divide passes in an irregular line, entering the park near the southeastern corner and extending in a general northwesterly direction, leaving the western boundary near its middle point. This divide is a plateau, varying in altitude from 7,000 to 8,500 feet. In the southeastern part of the park is the Two Ocean Plateau, so named because rivers having their source in it flow respectively to the Atlantic and to the Pacific. In one locality these rivers come so near each other that during high water streams flowing in both directions are fed from the same source.

Canyons The rivers are characterized by their clear water, swift current, deep canyons and beautiful cascades. Among the minor canyons worthy of mention are the Golden Gate, the Canyon of the Gibbon and the Canyon of the Gardiner. But surpassing all of these in beauty and grandeur is the Grand Canyon of the Yellowstone, a gorge nearly twenty miles in length and in places over 1,400 feet deep. The upper part of this canyon, for about five miles, consists of bare rocks, noted for the variation and brightness of their coloring. Prominent, among the colors are red, terra cotta, yellow and gray. At the head of this gorge is the Great Fall of the Yellowstone, where the stream makes a perpendicular descent of 310 feet. While other canyons are larger, it is generally conceded by travelers that nowhere else in the world has there been found a natural gorge which, for beauty and grandeur combined, equals the Grand Canyon of the Yellowstone.

Falls There are over thirty waterfalls in the park. Some of these are small cascades, scarcely worthy of notice, while others are cataracts seldom surpassed for their beauty and grandeur. Among the falls worthy of mention are Gibbon Falls, eighty feet in height, Firehole Falls, upon Firehole River, sixty feet, Kepler Cascade, eighty feet, the Osprey Falls, 150 feet, Tower Falls, 132 feet, and the Falls of the Yellowstone, the upper fall of 112 feet and the lower of 310 feet. The last are the largest and by far the grandest falls of the park.

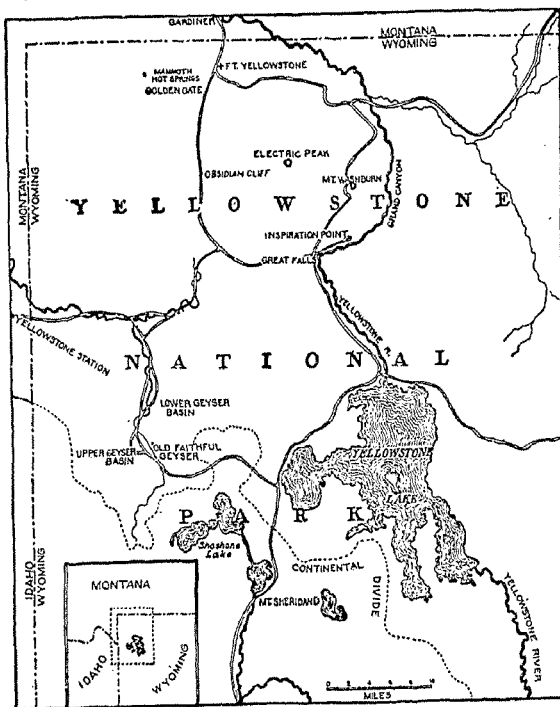
Lakes Foremost among the bodies of water in the park is Yellowstone Lake. This sheet of water has an altitude of 7,741 feet and is the largest body of fresh water in the country at so great an altitude. Its area is 139 square miles, its maximum depth, 300 feet, and its shore line about 100 miles. Its waters are cold and swarm with fish. On the shores of the western projection, known as The Thumb, is seen the peculiar proximity of hot and cold water for which this region is noted. Here are several hot springs, whose cones have been built up within the lake, so that they are surrounded by cold water, and one can easily catch fish from the lake and, without moving from his tracks, immerse them in a spring hot enough to cook them. Other lakes of importance are Shoshone, to the south and west of Yellowstone; Louis Lake, south of Shoshone, and Jackson Lake, just across the southern boundary.

Hot Springs Within the boundaries of the park are found no fewer than 4,000 hot springs and 100 geysers, whose temperatures vary from 60° to 175°. Many of the springs boil and, to a casual observer, would appear to have the temperature of ordinary boiling water, however, much of the ebullition is due to the escape of gas. The most prominent of these springs are the Mammoth Hot Springs, situated about five miles from the Gardiner entrance and near Fort Yellowstone, which is the administrative headquarters. These springs are noted for the beautiful terraces which they have formed, covering in all an area of nearly 200 acres, and varying in altitude from a few feet to nearly 350 feet. These terraces have been formed by the overflow of the water, which is charged with limestone, that is, held in solution while the water is hot; as the water overflows and runs down the side of the crater it evaporates and deposits minute particles of the solidified

YELLOWSTONE NATIONAL PARK 3964 YELLOWSTONE NATIONAL PARK

lime. Thus, as the years go by, the spring builds up its crater, raising the level of the water higher and higher and increasing the height and extent of the walls which enclose it. These terraces are objects of rare beauty, because of their great variety of coloring. Some are bright yellow; others of a terra cotta hue, while others are nearly white; many have a variety of colors. The water in the springs is remarkably clear, and be-

quiescent pools and are of interest because of the beauty of their coloring. The contrast in coloring is remarkable and is due entirely to the reflection of light from the crater of the spring, since in all cases the water taken from them is transparent. Among these springs of special note are the Turquoise Spring, in the Middle Geyser Basin; Prismatic Lake, a pool of hot water over 150 feet across, under ordinary conditions reflecting



YELLOWSTONE NATIONAL PARK

cause of the reflection from the crater it has a peculiar blue color, seen nowhere else.

Aside from the Mammoth Hot Springs, the smaller springs are quite generally distributed throughout the park, though they are the most numerous in three localities, where they intermingle with the geysers. These localities are the Norris Geyser Basin, the Lower Geyser Basin and the Upper Geyser Basin. Most of the hot springs are merely

all the tints of the rainbow; the Morning Glory Spring, Emerald Pool; Sapphire Pool, and the Punch Bowl, so named because of the form of its crater.

Geysers. There are two classes of geysers—the geysers proper and those known as fountains, which are distinguished by an eruption in which all of the water in the crater is thrown out in the form of a great fountain, leaving the crater empty. The

eruption of a fountain geyser lasts but a few moments; and will not be repeated until the crater is refilled. The most remarkable geysers of this type are the Fountain and the Great Fountain, both in the Lower Geyser Basin. Of the true geysers, Old Faithful, which has an eruption every seventy minutes and throws a jet of water varying from 75 to 125 feet high, the Beehive, the Giant, the Giantess, the Castle, and the Riverside are the most noted. The Giant, when in eruption, expels a column of water five feet in diameter to a height of nearly 250 feet and continues in operation for an hour and a half. The Giantess is even larger, but the eruptions are much less frequent. In general, the larger the geyser the longer the interval between periods of eruption. Most of the interesting geysers are found in the Upper Geyser Basin, where, within an area less than a mile square, nearly all of the large geysers are located. Interspersed among the large geysers are numerous small ones, some of which erupt every few minutes.

Other Objects of Interest. The greater part of the park is covered with beautiful forests of pine, through which the tourist passes on his way from one point of interest to another. The Park is a game preserve. Hunting is strictly prohibited, and the forests now abound in large game, including bears, elk and antelopes. There are also a few wild buffalo, and their number is increasing every year. The care taken of these animals has removed the timidity which generally characterizes them, and they are frequently seen by tourists, while the bears in many instances become very tame. In addition to the more striking features described above, there are many minor objects of interest, such as Obsidian Cliff, a mountain of volcanic glass from 250 to 300 feet in height, the Paint Pots, which are really hot springs, expelling colored clay from their craters, and mud geysers and volcanoes, differing from the other geysers in ejecting turbid water. Roaring Mountain is a hill several hundred feet high, from the openings in whose sides issue jets of steam with such force that they can be heard at quite a distance. In each of the hot spring regions are also found vents, known as *fumeroles*, through which steam escapes with a terrific force.

Tours through the Park. Yellowstone National Park belongs to the people, and

anyone can visit it and make a tour to suit his pleasure. He is bound only by such restrictions as are necessary to preserve the natural beauty of the region and to protect the wild animals. Guns are not allowed, and visitors cannot cut growing timber. If they make camp fires, they are required to see that such fires are carefully extinguished before they break camp. Marking or defacing the formations about the geysers in any way is strictly forbidden, and one transgressing in this respect is subject to heavy fine, if caught.

The roads through the park are not excelled anywhere in the country. Automobiles were admitted for the first time in 1915, and now they are used for all transportation. Large hotels, with an equipment equal to those in the largest cities, have been opened at Mammoth Hot Springs, the Upper Geyser Basin, at the Fountain and at the Canyon, and tourists who desire these accommodations can make a trip through the park as comfortably as they can travel the same number of miles in any other region in the world.

Transportation companies operating permanent camps provide equally enjoyable and less expensive accommodations, or parties may travel with their own outfit and set up their camps at their pleasure. However, after their store of provisions has been raided by bears two or three nights in succession, they will probably place themselves in care of one of the transportation companies. The park is entered by three gateways—Gardiner on the north, Cody on the east, and Yellowstone on the west. The Gardiner gateway is the most convenient, because it is on the boundary and nearest to the hot springs and geysers. The regular trip includes a ride of about 150 miles and should take five or six days.

YELLOWSTONE RIVER, a river of the United States, the largest tributary of the Missouri. It rises in Northwestern Wyoming, in the Continental Divide, flows northeast through Montana and into the Missouri a short distance beyond the boundary of North Dakota. Its length is about 1,100 miles. Throughout most of its course the river is followed by the Northern Pacific Railroad.

YEMEN, a territory of Southwestern Arabia, bordering on the Red Sea. It embraces an area of about 73,800 square miles.

and is a region of mountains and plateaus, from 8,000 to 10,000 feet in altitude. The coast lands are arid, but the valleys are gardens of tropical vegetation. Excellent coffee is grown. The people, numbering about 2,500,000, are engaged chiefly in stock raising. There are no railroads, but there are several caravan routes from the interior to the coast. Hodeida is the principal port. At the close of the World War there was under way a movement to have Yemen included in a united Arabian state free from Turkish control. See ARABIA, TURKEY.

YEN, the monetary unit of Japan, equivalent to about fifty cents of United States money. The yen was formerly coined in both gold and silver, but in 1897 Japan adopted a gold standard, and since that time no single gold yens have been coined, but two-yen, five-yen, ten-yen and twenty-yen pieces are in common use. The smaller denomination in Japanese money is the sen, equivalent to a half cent. The 5-sen is coined in nickel, 10-sen, 20-sen and 50-sen pieces, in silver.

YENISEI, *yen e say'e*, a river of Asia, one of the longest in the world. From its sources in the Sayansky Mountains, in Northwestern Mongolia, it flows in a general northwesterly direction and enters the Arctic Ocean near the Gulf of Ob, through an estuary about 500 miles long. Above the estuary its length is 2,500 miles. An area of 1,000,000 square miles is drained by it. South of Krasnoyarsk, near which it is crossed by the Trans-Siberian Railway, it is ice-free half the year, and it is navigable to Minusinsk, at the mouth of the Angara River. With its navigable tributaries and canal connections the Yemsei is of the greatest commercial importance to Western Siberia.

YERKES OBSERVATORY, an astronomical observatory situated at Williams Bay, an arm of Lake Geneva, Wisconsin. It is owned by the University of Chicago, and was named in honor of Charles Tyson Yerkes, who donated the money for buildings and instruments. The refracting telescope of this observatory is the largest of its kind in the world, having a diameter of forty inches. See TELESCOPE.

YEW, *yü*, an evergreen tree of the pine family, with dense, spreading branches, thickly covered with very dark green linear leaves. The common yew of Europe is very long-lived, and in England it is planted in cemeteries and is considered an emblem of

immortality. The leaves and seeds are poisonous, but the red berries are not. The tough, elastic wood was used for making bows in the days before firearms were invented. The American yew is commonly known as *ground hemlock*, and is a low shrub, with straggling branches, common in dense forests.

YGGDRASIL, *y'ära sil*, in Norse mythology, the enormous ash-tree which binds together heaven, earth and the underworld. It was the tree of life, fate, time and space.

YIDDISH, the dialect spoken by the Jews of Eastern Europe, used by more people than any other Hebrew form of speech. It represents a combination of various languages, notably Hebrew, German, Aramaic and Slavic, and has been carried to all parts of the world. In the United States Yiddish is widely used as a newspaper language, and has been the vehicle of many noted Jewish writers.

YOKOHAMA, *yo ko kah'mah*, JAPAN, the chief commercial center of the empire, is situated on the east coast of Honshu, on the Bay of Tokyo, seven miles southwest of the latter city, with which it is connected by railway. It is on a large harbor, which is protected by breakwaters. The city is well planned and has a number of excellent public buildings. Most important of these are the customhouse, the postoffice, the courthouse and the railway station. The city has a number of modern churches and in most respects resembles a European town. The harbor is lined with massive docks, and the surrounding heights are occupied by fine residences. It is the port through which most visitors enter Japan. On September 1, 1923, a violent earthquake followed by tidal waves and destructive fires brought ruin to this and other Bay cities, with loss of thousands of lives. Population, 1930, 620,306.

YONGE, *yung*, CHARLOTTE MARY (1823-1901), a novelist and essayist, born at Otterbourne, England. She was an exceedingly prolific writer, and produced in all about 125 volumes, including novels, short stories, essays, biographies, histories and school books. Her best-known novels are *The Heart of Redcliffe*, *The Daisy Chain*, *The Dove in the Eagle's Nest*, and a life of Hannah More. Her historical works include *Cameos of English History*, *English Church History* and *Landmarks of History*. She gave large sums to schools and to church and missionary work throughout the world.

YONKERS, N. Y., in Westchester County, on the east bank of the Hudson River and on the New York Central Railroad, fifteen miles from the New York City terminal. It is beautifully located on gradually-rising ground, opposite the Palisades, and its residence section has many beautiful homes of New York business men. It is an important industrial and commercial center, with foundries and machine shops, shipyards, wire works, patent medicine and chemical factories, grain elevators, sugar refineries and manufactures of hats, carpets and rugs. Prominent buildings are a city hall, a Carnegie Library, Saint Joseph's Seminary, the Woman's Institute, the Hollywood Inn for workmen, the Hebrew Home for the Aged and Infirm and several charitable institutions and hospitals. The Philipse Manor House, now a museum, dates from 1682. There is a steel recreation pavilion on the water front.

Yonkers was settled by the Dutch about 1650. After 1672 it was part of Philipse Manor, until the township of Yonkers was organized in 1788. The settlement itself was called Philipsburg until its incorporation into the village of Yonkers in 1855. In 1872 the northern part of the township was chartered as the city of Yonkers, and the southern part was later annexed to New York City. Population, 1920, 100,176; in 1930, 134,646, a gain of 34 per cent.

YORK, ENGLAND, county town of Yorkshire, situated on the River Ouse at its confluence with the Foss, 175 miles northwest of London. It is the seat of the York Cathedral, one of the finest Gothic structures in the world, and has many relics and reminders of early and medieval English history. The old city is surrounded by massive stone walls, and has narrow, irregular streets. A beautiful modern suburb has been built on the opposite bank of the Foss. The city's industries include flax spinning and the weaving of linen, iron founding, construction of railway cars, and the manufacture of gloves, combs, glass, etc. There is a thriving river trade. The railway station is one of the finest in Great Britain. Population, 1911, 82,282; in 1921, 84,052.

YORK, PA., the county seat of York County, ninety-six miles west of Philadelphia, on Codorus Creek and on the Pennsylvania, the Western Maryland and the Maryland & Pennsylvania railroads. It is

situated in a rich and beautiful agricultural valley and has manufactures of foundry and machine shop products, bricks, cement, lime, farm implements, wire, chains, nails, wagons, pianos, furniture, wall paper, silk, flour and cigars. Institutions located here are the York Collegiate Institute, the York County Academy, a children's home, a county almshouse, a tuberculosis dispensary and several hospitals. There are a Federal building and two public libraries.

York was settled by Germans in 1734, and the town was laid out in 1741. The Continental Congress met here from September, 1777, to June, 1778, when it was driven from Philadelphia by the approach of Howe's army. The borough was incorporated in 1787, and the city was chartered in 1887. It adopted the commission form of government in 1913. Population, 1920, 47,512; in 1930, 55,254.

YORK, HOUSE OF, a royal family of England, which attempted in the Wars of the Roses to wrest the crown from the Lancastrian House, as represented by the king, Henry VI (see *ROSES, WARS OF THE*). The Yorkists had, indeed, the superior claim, as Richard, Duke of York, was descended from a third son of Edward III, while Henry VI was descended from a fourth son. Richard died in 1460, and his son continued the struggle, after a short time he was crowned king as Edward IV. With the exception of a short interval, Edward was king until 1483, and after his death his son was crowned king as Edward V. Richard, Duke of Gloucester, the brother of Edward IV, killed his royal nephew and was made king, but was overthrown by Henry Tudor (Henry VII), Earl of Richmond, the head of the Lancastrian House, who united the claims of the two families by marrying Elizabeth, the daughter of Edward IV.

YORKTOWN, VA., the county seat of York County, seventy miles southeast of Richmond. It has filled large space in American history on two occasions. In 1781, in the Revolutionary War, it was fortified by Cornwallis and was captured by American arms only after a siege lasting from August to October. On April 5, 1862, in the Civil War, McClellan, in command of 95,000 Federal soldiers, began a siege of the place, then strongly held by 55,000 Confederates. It capitulated on May 4. The population is now only about 500.



Yosemite, *yosem'ete*, NATIONAL PARK AND VALLEY, one of the most magnificent scenic areas of the American Continent

Yosemite National Park, a section of the world's "enchanted lands," lies in the central part of California, just west of the Sierra Nevada Mountains. It has

an area of a little over 1,100 square miles, and includes the famous Yosemite Valley, the Tuolumne Valley and three groves of sequoias, or California Big Trees.

Yosemite Valley This valley, which has been aptly described as a "mere crack in the rocks," is one of the most famous of the world's regions. The valley was formed by the Merced River and by glacial action. It is seven miles long, and from one-fourth of a mile to a mile wide. The floor of the valley is a flat meadow carpeted with flowers, and from its sides rise vertical cliffs to heights varying from 3,000 to 6,000 feet. The most widely-known of the great summits guarding the valley are Cathedral Rocks, 2,500 feet, El Capitan, 3,600 feet, Sentinel Dome, 4,100 feet; Half Dome, 4,900 feet, and Cloud's Rest, 6,000 feet.

Over the sides of these cliffs numerous rivers rush headlong to the valley below, forming some of the highest and most beautiful waterfalls in the world. Among them are Yosemite Falls, which drop 1,430 feet in a single fall; Lower Yosemite, immediately below, with a fall of 320 feet, Vernal, 320 feet, Nevada Falls, 600 feet, the celebrated Bridal Veil, 620 feet, and the Ribbon Falls, 1,612 feet. This is one of the highest single falls in the world. These falls are at their best in May and June, when the winter snows are melting. Mirror Lake, in whose waters a remarkable reflection of the surrounding mountains may be seen, is another attractive feature of the valley.

Yosemite Valley is about 150 miles' nearly east of San Francisco, and may be reached from Merced on the Santa Fé and Southern Pacific railroads, and by the Yosemite Valley Railroad, which extends to the western border of the park. From the railway terminus stages take tourists through the valley. The roads are good, and during the tourist sea-

son, from May 1 to November 1, hotel and camp accommodations are ample. The park is free to all, and anyone is at liberty to provide his own transportation and to travel at his pleasure, subject to such rules as are necessary for the protection of the scenery. From Yosemite Valley roads lead to Mariposa and other groves of Big Trees and to Tuolumne Valley.

Yosemite Valley was discovered in 1851 by a party in pursuit of a band of Indians, who made it their hiding place, supposing it to be inaccessible to white men. In 1864, by act of Congress, it was granted to California for a state park, upon condition that it should be kept for the use of the public and that its scenery should never be injured. The Mariposa grove of big trees, adjoining the valley, was also granted to the state at the same time. Since 1890 it has been known as the Yosemite National Park. The most desirable months in which to visit the valley are June, July and the early part of August. Later in the season a number of the streams become dry, and their falls disappear.

YOSHIHITO, *yosh'he'toh*, HARUNOMIA (1879-1926), emperor of Japan, succeeded to the throne on the death of his father, Mutsuhito, July 29, 1912. He was educated at Tokyo, and spoke fluently French, English and German. He was simple and direct in his manner and speech, and his policy was progressive. Much tact and discretion have been shown by him as a harmonizing influence between the traditions and ideals of old Japan and the up-to-date ideas of the Western world, with which Japan must keep abreast to maintain its position as a world power. The emperor's personal taste inclined toward outdoor sports, and he was a lover of dogs and horses. In 1900 he married his cousin, Princess Sada-Ko, and had three children, the oldest, Hirohito, succeeding him on his death in December, 1926.

YOUNG, *yung*, BRIGHAM (1801-1877), the successor of Joseph Smith as president of the Church of Jesus Christ of Latter-Day Saints. His father was a Vermont farmer, and he himself learned the trades of painter and glazier. Early in life he joined the Baptists, but was converted to Mormonism and joined the sect at Kirtland, Ohio, in 1832. In 1835 he was ordained one of the Council of Twelve Apostles. When the sect began to be persecuted Young and Smith selected Nauvoo, Ill., as the site for a new

colony. On the death of Joseph Smith, in 1844, Young was unanimously chosen president.

When the Mormons were expelled from Nauvoo he led them through toils and dangers over the plains and tablelands to the splendid valley where, between the Wasatches and the Great Salt Lake, he founded, in July, 1847, the settlement which became Salt Lake City. The Mormons organized their territory into a state, and Young became governor. Later, difficulties arose with the Federal government and President Buchanan appointed a territorial governor to succeed Young. He continued ruler of his sect until his death in 1877. He was a man of strong character, remarkable foresight and unusual executive ability.

YOUNG, CHARLES AUGUSTUS (1834-1907), an American astronomer, who graduated at Dartmouth in 1853 and after teaching at Phillips Academy, Andover, in 1856 became professor of natural philosophy and mathematics in the Western Reserve College, Ohio. In 1877 he was appointed professor of astronomy and natural philosophy at Princeton, after serving in the same capacity at Dartmouth. Young made the first observation of the spectrum of the solar corona (the luminous envelopes of the sun) in August, 1869, and later he made many other important observations. He gave his assistance to the eclipse observations in Iowa in 1869, in Spain in 1870, in Denver in 1873, and was one of the party who studied the transit of Venus at Peking in 1874. He was one of the foremost authorities on the subject of spectra. *The Sun, General Astronomy, Elements in Astronomy and Lessons in Astronomy* are among his publications, which include also textbooks and papers on miscellaneous scientific subjects.

YOUNG, EDWARD (1683-1765), an English poet, born at Upham, Hampshire. His earliest large work was *Busiris*, a tragedy written in 1719. This was followed by *Revenge* and a group of satires entitled *The Love of Fame, the Universal Passion*. He took holy orders, and in 1730 became rector of a church at Welwyn in Hertfordshire. Young is chiefly remembered for his *Night Thoughts of Life, Death and Immortality*, a religious poem containing numerous pointed verses which have become axiomatic.

YOUNG, OWEN D. (1874-) an American lawyer and financier. He was born at

Van Hornesville, N Y. His education was gained at Saint Lawrence University and Boston University law school. In 1896 he began the practice of law in Boston. He was a law partner of Charles H. Tyler, but in 1912 he broke the connection to become chief legal adviser for the General Electric Company, later he became vice-president and in 1922 he was chosen as president of the board of directors.

He served at later dates in several important posts: head of the Radio Corporation of America, director of the Federal Reserve Bank of New York, of the General Motors Corporation, of the International General Electric Company, chairman of the American section of the International Chamber of Commerce, a member of the second industrial conference appointed by President Wilson, and chairman of the committee on business cycles appointed by President Harding.

Probably his most distinguished service was given to the matter of reparations that were to be paid by Germany to the victorious allies. He was a member of the "Dawes Committee" appointed in 1923, and was summoned as agent-general to supervise the execution of the plan contained in the report of the commission. Later he resigned this position, but was chosen chairman of a new commission charged to fix the amount of payment that should be demanded of Germany. By June 1929 the new plan was completed, it involved laying aside several important features of the Dawes plan to make way for the Bank of International Settlements.

YOUNG MEN'S CHRISTIAN ASSOCIATION, or the "Y M C A" an international alliance of organizations in thirty-three countries; each organization is made up of local societies.

The object is to promote character education through informal activities based upon the voluntary interest of the member. Associations seek the physical, intellectual, social and religious development of youth so that they may embody Christian ideals and seek for the realization of Christian principles in society.

George Williams organized the first association in London in 1844. In 1851 groups of young men in Boston and Montreal took up the movement and immediately it began to spread throughout the country. The cen-

tral committee supervised these activities beginning with 1866

Buildings with dormitory facilities, gymnasiums and other social and educational equipment are characteristic of the city associations, but small town and country associations, high school and college associations and certain others carry on non-equipment activities

Individual services include personal counseling, part-time educational activities, job placements, dormitory residence and other needed assistance.

The association movement has had its largest development in North America where are to be found more than one-half of the total members, two-fifths of the buildings and two-thirds of the employed secretaries

In the entire United States there are about 1,200 associations with nearly 1,000,000 members. Among the members 65 per cent are over 18 years of age. More than half of the activities of the associations are carried on in the cities. The headquarters of both the national and international work is in New York City.

During the World War at government request the associations sent out 20,000 special workers among the nation's armed forces at home and abroad.

The "Y" has become a fixed part of American culture and a prominent institution among the organizations operating for the public welfare. It renders a service that has inspired similar organizations among non-Protestants.

Extension work in foreign lands at one time required the labors of about 250 secretaries sent out by the international committee; four-fifths of the foreign associations have now become self-supporting with but 8 per cent of their leadership supplied from the United States.

YOUNGSTOWN, OHIO, the county seat of Mahoning County, 67 miles southeast of Cleveland, on the Mahoning River and on the Erie, the Pennsylvania, the New York Central, the Baltimore & Ohio, the Pittsburgh & Lake Erie and the Lake Erie & Eastern railroads. There are several airports and landing fields for airplanes. The manufacture of iron and steel is the most important industry, and there are also lumber mills, bridge works, and furniture, engine, automobile, wagon and other factories. Youngstown is provided with several hos-

pitals, and homes for dependent persons. Important buildings are Butler Art Institute, Stambaugh Auditorium, the Masonic Temple, the Federal building and the McMillan Free Library. Mill Creek Park, 1353 acres in extent, is regarded as the most beautiful natural park in the state of Ohio. The first settlement was made by John Young on a tract of land purchased from the Connecticut Land Company in 1797. It was incorporated as a city in 1848, and became the county seat in 1876. David Tod, who became the "war governor," was a pioneer in coal-mining, canal and railway enterprises. Population, 1920, 132,358; in 1930, 170,002.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION. A voluntary organization of women and girls who are convinced of the supreme importance of the Christian way of living. It was organized in London in 1855; three years later the first association was organized in the United States. Fifty different countries are represented in the international organization, headquarters is in Geneva, Switzerland.

In the United States there are over 1,000 local organizations, more than half of them are found in the colleges and universities, 168 organizations serve foreign communities, Indians and Negroes. Members number about 400,000. American headquarters is in New York City.

YOUTH MOVEMENTS, a term applied to group activities of persons usually aged fourteen to twenty-five who in many countries are seeking readjustment to present-day conditions. The phrase does not denote a planned campaign managed from international headquarters, but refers to outbreaks of youthful enthusiasm and eagerness to take part in the affairs of society.

German Movements. In Germany about 1908 there occurred a revolt against social trends that seemed fruitless and antiquated. Young people discovered that the schools stood apart from practical life, that parents were dominating and very conservative, that judgments passed on young people by adults were trivial and beside the mark. Consequently there arose a cry for release and liberty. Hence sprang up the wandering bands of young persons, and lodging-places were opened for these travelers. Finally came the recognition of the youths of Germany as a powerful and insistent social group.

The earlier period of the movement was largely an emotional outburst, later on an intellectual trend set in. Organized groups of youths met in a great conference at Cassel in 1913, but war reduced their numbers from 12,000 to 7,000.

The consequences may be summed up as follows: an increased simplicity in living that touched dress, food and the like, wide acquaintance through travel and culture, through study and recreation, the union of the younger, the older and the matured young people in one organization, an increased comradeship between the sexes, education conducted by comrade-leaders, a strong sense of the moral value in the search for truth and a religious faith in the good in life.

Swiss and Russian Movements In Switzerland the demand for greater freedom was very urgent, but the young people took their parents along with them instead of revolting against domestic influence. They scorned the philosophies of antiquity and bent their gaze on the things of today, there was some indifference to the churches but not to religion.

In both Switzerland and Germany the movement changed in the course of its growth, and yet it forced readjustments in the old educational and social programs.

In Russia 5,000,000 boys and girls, and young men and women, belong to the *Con-somoi*, the official, organized movement. The Soviets dominate the whole policy and use the institution as a means of training in politics and economics. New importance has been attached to cleanliness, neatness, stability of the family, education and a general attitude such as prevails in Western Europe, in fact the youth movement of Russia is changing certain aspects of Russian policy in a remarkable degree.

American Movements In the United States, when 3,000,000 persons aged 16-25 are neither in school nor at work a development of the youth movement is to be expected. Not content with a cynical and defeated state of mind young leaders have sprung up with a call to action. "The National Youth Movement" began at a friends conference of three persons and finally enrolled thousands after applying fusion methods in an attack on the politicians of Kansas City. The Seattle Movement seemed at one time about to seize the political power of the state (The "Young Republicans" of New

York State formed political study clubs.)

The "National Conference of Students in Politics" is composed of eleven liberal, radical, pacifist and religious college organizations, it opposes the framing of reserve officers, race discrimination and cutting of educational privileges. The "National Student League" is communistic, The "League for Industrial Democracy" follows Norman Thomas. The "National Student Federation" is made up of campus politicians with a middle-of-the-road viewpoint, but critics discern a fascist leaning.

"The First American Youth Congress" assembled in August, 1934. Communists were denied leadership and the following proposals were endorsed: Federal expenditures for education, unification of school curricula, sex-education, reform of divorce laws, opposition to war, social insurance, a system of youth lodging-places, a Federal apprentice plan and assistance in establishing homes.

YPRES, 6 pr', BELGIUM, a partly ruined city around which were waged three sanguinary battles of the World War. Although left almost wholly unrestored, as a war memorial, some of the historic buildings have been repaired or reconstructed. The beautiful cathedral of Saint Martin, dating from the thirteenth century, has been repaired. The famous Belfry of Ypres was reconstructed in 1934 and restored to its former sculptural beauty. Before the war Ypres had a population of 19,000.

YSAYE, sash'ye, EVGENE (1858-1931), a Belgian violinist, born at Liège. He was taught by his father, an able violinist, who in time sent him to the Liège conservatory. Subsequently he studied under great masters of the violin. He showed such promise that the state helped him to complete his studies at Paris. In 1881 he began the concert tours which were to reveal him to the world as one of its foremost violinists. Five years later he became director of the violin department of the Brussels conservatory, where he organized the famous Ysaye quartet. He retired in 1898 to devote all his time to concert work. Ysaye's playing was characterized by a sound and brilliant technique and a rich, full tone having an infinite variety of shading. He wrote a number of compositions for the violin, among them are the well known six concertos and his "Suite Wallone." He was for a time conductor of the Cincinnati orchestra, beginning in 1913.

YUAN SHI KAI (1858-1916), Chinese statesman, first president of China. Li Hung Chang observed his powers as a military leader and placed him in civil office. He rose rapidly, became a reformer and yet supported the monarchy. He was the chief executive in the republic that displaced the empire, but his ambition to become emperor was defeated by mutinies, revolts and the intervention of the powers. He died in 1916 from poisoning, as reported. See CHINA, subhead *History*.

YUCATAN, *yoo tah tahn'*, a peninsula constituting the extreme southeastern part of Mexico and embracing the territory of Quintana Roo, the states of Campeche and Yucatan, and small parts of British Honduras and Guatemala. It projects northward between the Gulf of Mexico and the Caribbean Sea, it is smaller than West Virginia, with an area of 23,926 square miles.

Physical Features. The coast on the west and north is sandy and flanked with low sand dunes. On the east there are bluffs, and several islands off shore. Beneath the surface soil is a vast bed of coralline limestone; from this the thin and now infertile soil has been developed through weathering processes. The climate is hot and dry, with an annual rainfall insufficient for extensive agriculture on the uplands. Cool sea-winds and the "northers" modify the intense heat throughout its entire area.

Products. On the coast lands valuable forests provide mahogany, vanilla, logwood and other dye-woods. Field products are maize, sugar cane, cotton, coffee, tobacco and the principal crop of henequen from which sisal hemp is manufactured. Here is the world's chief source of sisal hemp, of which as much as 200,000,000 pounds have been exported in one year.

History. It appears that Yucatan had one of the oldest civilizations in the Western world. The Mayas, driven by hostile forces, discovered and entered the peninsula between A. D. 471 and A. D. 530 in a series of invasions, but their civilization had been developing for at least a thousand years. The great exodus from their empire in central Mexico resulted in the forming of city-states in Yucatan; three of these larger ones established an alliance that led to great prosperity. Huge stone buildings with extensive sculptured decorations were built everywhere. Pyramid temples appeared in towns and even

villages. In 1201 the alliance broke down from internal rivalry and with the aid of Toltec-Aztec allies. These newcomers assumed leadership and introduced rites and customs which required building of temples for the new gods. The Kukulkan temple for example was erected for this purpose, it covers an acre of ground and reaches to the height of 100 feet. Ceremonies attracted worshippers who lived hundreds of miles away.

The Mayan buildings, which extensive excavations have brought to light, have become world-famous, they include pyramids, temples, altars, palaces and dwellings. No mortar was used, the corners were not bonded, hence vegetation easily entered the cracks and wrecked such structures.

These early Mayans used maize as the principal food. They engaged in hunting, trapping, fishing, bee-keeping and poultry-raising. They carried on also quarrying, weaving and pottery. Little use was made of metals, but copper was employed to some extent. Gold came into use in later centuries.

The first Europeans to reach Yucatan were twenty shipwrecked Spaniards who were captured in 1511 or 1512. Slave hunters arrived in 1517. Cortez passed through in 1524. By 1552 the Spaniards were in full control of the country, and even resisting some of the avaricious conquerors among their own number who sought to exploit the natives. The population reported in 1700 was 300,000, wars, famines and disease did not for a long time diminish this native population.

Mexico became independent of Spain in 1821. Yucatan joined immediately in the movement to set up a republic, but her relations to the central government were fast and loose until 1854. Under Diaz misery fell upon the masses and Yucatan suffered with other districts. Leaders have arisen and the two states of Campeche and Yucatan have shared in Mexico's political agitations and later development. Conditions have vastly improved since the Revolution beginning in 1910. Population nearly 400,000. See MAYA and Mexico.

YUCCA, a genus of plants belonging to the lily family, native of southern United States. A species known as *Bayonet plant*, or *Adam's needle*, bears beautiful bell-shaped flowers and long stiff evergreen leaves.

It is a popular plant for a shrub border. The *Yucca gloriosa* has a two-foot stem, on the end of which grows a cluster of leaves, from which springs a flower stalk bearing numerous drooping bells, striped with purple. The tough fiber of the *Yucca glauca* is used by southwestern Indians in making baskets.

YUGOSLAVIA See **JUGO-SLAVIA**

YUKON RIVER, one of the largest rivers of North America and fifth in capacity in the world. It rises in the west central part of Yukon Territory, Canada, flows northward and northward into Alaska, then westward and southwestward, entering Bering Sea 60 miles southwest of Michael. Its total length is about 2,300 miles. It is fed by numerous streams which are the outlets of marshes and lakes. In some places the current is swift and the river is obstructed by rapids. Small steamers have descended these rapids, but those at White Horse form an impassable barrier to up-river steamers, so that the river is divided into two navigable sections, which are now connected by railway. However, the river is navigable for the whole course of 1,200 miles within Alaska and for 800 miles in Canada. During the open season steamers make regular trips as far as White Horse, and small boats go to Dawson, in the Canadian Yukon Territory.

YUKON TERRITORY, a political division of the Dominion of Canada, popularly called The Yukon. It is located in the extreme northwest between the North West Territories on the east and Alaska on the west. British Columbia bounds the territory on the south, and the Arctic Ocean is on the north. The sixtieth parallel forms the dividing line between the Yukon and British Columbia, and the 141st meridian (W) the line between the territory and Alaska. The North West Territories and the Yukon are separated by the Rocky Mountains.

Having an area of 206,427 square miles, The Yukon is about one-half the size of Ontario, one-sixth the size of the North West Territories, and lacks about 59,000 square miles of being as large as Texas. Of the total area 1,730 square miles are water. The territory is irregularly triangular in shape, the broadest portion being the southern boundary, and the narrowest the Arctic shore line. In 1901 during the gold-mining boom the population was 27,218, this has declined to about 4,000. Dawson is the capital and chief town, population, 1932, 828.

Physical Features In general the surface of the territory is a rolling plain diversified by mountains and river valleys. The average elevation is from 2,000 to 3,000 feet, but in the extreme southwest, near the Alaska border, Mount Logan towers 19,539 feet above the sea. It is the highest peak in Canada, and next to Mount McKinley is the highest in North America. There are several other peaks in this region which are from 15,000 to 18,000 feet in altitude. Branches of the Yukon River traverse the territory over most of its area, but the southeastern corner is drained by the Liard River, which belongs to the Mackenzie River system. The line of perpetual snow is at 4,000 feet altitude. Vegetation flourishes during a short season.

Resources and Industries Gold is by far the most valuable resource of the Yukon. In 1896 rich deposits were discovered in the Klondike, near the Alaska boundary, and when the fact became known thousands of prospectors flocked to the district to make their fortunes. In 1900, when the boom was at its height, gold to the value of \$22,275,000 was taken from the mines. After the exhaustion of the placer deposits, more expensive methods of mining were introduced, which caused a marked decline in yield and in the population of the region. The yearly output is now valued at about \$5,000,000. As much as 2,539,633 ounces of silver have been produced in a year. The lignite and anthracite coal deposits have been developed for local use. Home requirements are partially met in farming, gardening and manufacturing. The chief grains are barley and rye. The summers are very short and frosts occur throughout the year, but these disadvantages are somewhat offset by the long summer days, at Dawson the longest days have about twenty hours of daylight.

Government Before the discovery of gold in the Yukon, the territory was inhabited only by a few Indians, but the sensational finds in the Klondike brought in as many as 30,000 settlers in one year. Parliament organized a government to meet the requirements of the population. The Territory is now governed by a comptroller responsible to the Canadian Department of the Interior, and sends one representative to the Dominion House of Commons.

Related Articles Consult the following titles for additional information:
 Alaska
 Dawson
 Klondike
 Yukon River

Walk in Darkness and *Ghetto Comedies* are among his other writings. His most successful plays are *Merely Mary Ann* and *The Melting Pot*.

ZANZIBAR, *zahn ze bahr'*, an island off the eastern coast of Africa, forming a part of the British protectorate of Zanzibar. Its area is 640 square miles, and it is mostly low, the highest point being only 1,000 feet above the sea. The island is fertile and well cultivated. Cloves, copra, tobacco, vanilla, coconuts and other crops are grown. Fishing and cattle raising are important industries. The population of the protectorate, 236,000, includes Arabs, Persians and representatives of most of the native tribes of Eastern Africa. There are only a few Europeans. Mohammedanism is the chief religion.

Zanzibar, the capital and chief town of the island, contains the palaces of the sultan, the barracks, the fort, hospitals and a number of mission stations. It is an important port in the Eastern trade and has some manufactures. Population, 1931, 45,276.

The nominal head of the government is a native sultan, under British protection. The island is administered by British officials.

ZEALAND, *se'land*, the largest and most easterly island belonging to Denmark, containing Copenhagen, the capital and largest city of the kingdom. It is situated between the peninsula of Jutland and Sweden, and its outline is very irregular. The greatest length from north to south is eighty miles, its greatest breadth is sixty-five miles, and the area is 2,680 square miles. Most of the island is low, the greatest elevation not exceeding 400 feet. The land is covered with forests or fertile fields.

ZEBRA, a wild animal of South Africa, closely related to the wild ass and the horse, and having habits similar to those of the latter. It is grayish or cream-white in color, and is conspicuously marked with dark stripes on head, legs and body. In Africa zebra-hunting is a popular sport. The natives eat the flesh and use the hides for leather and as rugs. Until comparatively recent times great herds of zebras were common in Southern



ZEBRA

Africa, to-day the animals are rare, for they are victims of white and native hunters. They may be domesticated and made to accept the harness, but taming is difficult.

ZEBU, a species of ox, a native of India, whence it has spread into Persia, Arabia and Eastern Africa. It is used as a beast of burden, for plowing and hauling. The animal is remarkable for a convex forehead, short horns, large drooping ears and a fatty hump on the back. It is very gentle and docile.



ZEBU

Zebras vary greatly in size, the smallest being no larger than a large dog, while others are the size of a large ox. The colors vary. The white zebu bulls are regarded as sacred among the Hindus (who call them *brahmany*) and are allowed a free range. Zebras have been imported to Jamaica and Central America for use on farms.

ZEBULUN, one of the twelve tribes of Israel, named, according to Genesis XXX, 20, after the sixth son of Jacob and Leah. The name was also given to a country in Northern Palestine.

ZEOCHARIAH, *seh a'ri'ah*, son of Berechiah, son of Iddo, appeared as a prophet in Jerusalem, along with Haggai, in the second year of Darius Hystaspes (520 B.C.), encouraging the Jews to commence the restoration of the Temple.

ZEDEKIAH, last king of Judah, the son of Josiah, and successor of Jehonahim. He broke his oath of allegiance to Nebuchadnezzar and united with Egypt against him. He was made captive when Nebuchadnezzar conquered Jerusalem in 586 B.C., his sons were killed in his presence, and he was taken a prisoner to Babylon, where he died. The name was borne also by two false prophets.

ZEISLER, FANNY BLOOMFIELD. See BLOOMFIELD-ZEISLER, FANNY.

ZEMSTVO, the governing body of a province or district in Russia before the revolution.

of 1917. It was composed of representatives chosen by the peasants, the householders of the towns and the landed proprietors. This body was presided over by the president of the nobility of the district or province, and it was charged with the administration of economic affairs. The executive power of the zemstvo was entrusted to an *uprava*, elected by the assembly. See RUSSIA.

ZENANA, *zenah'nah*, among the Hindus that part of the house set apart for women. In Bengal the women occupy a separate building behind that of the men; the rooms open upon an inner court, and the inmates are entirely separated from the outside world. In 1855 Protestant missionaries organized the Zenana Mission for the purpose of alleviating the conditions of zenana inmates.

ZEND-AVESTA, the sacred book of the Parsees, a religious sect of India, followers of Zoroaster. It contains songs of praise, prayers, the liturgy and a priestly code. It was first translated in 1771 by Anquetil-Duperron, a French scientist.

ZENITH, a term used in astronomy to indicate the point in the heavens directly overhead. It is opposite of nadir (which see).

ZENO, the founder of the Stoic school of philosophy, was born of a merchant family of Citium, in Cyprus, about the middle of the fourth century B. C., and is said to have lived about eighty years. According to tradition, he was shipwrecked and went to Athens, where he first read the works of Socrates' disciples. He studied Cynic doctrine, then turned to Stilpo, later to the teachings of Xenocrates and of Polemo. He then founded at Athens a school of philosophy in what was called the "Painted Porch," where he is said to have taught fifty-eight years. He practiced and taught temperance and virtue and was much esteemed by his fellow citizens, who erected a bronze monument to his memory after his death. See STOICISM.

ZENO'BIA, queen of Palmyra, Arabia, who succeeded to the throne as regent for her son, on the murder of her husband, Odenathus, in A. D. 267. She aimed at a dominion which should include Egypt, Syria and Asia Minor, and should make good her title of "Queen of the East." Her ambitions clashed with Rome, and in 272 her armies were defeated by those of Aurelian. She was taken captive to Rome, but the emperor was so impressed with her beauty and elevation of

character that he gave her a villa on the Tiber, and Zenobia's daughters were married into noble Roman families.

ZEPHANIAH, *zef a'n'ah*, a Hebrew prophet, who flourished in the reign of Josiah, 600 B. C. His book of three chapters, the ninth of the Minor Prophets, predicts the desolation of Judea, as a punishment for idolatry and worldliness.

ZEPPELIN, *tsep e'leen'*, COUNT FERDINAND (1838-1917), a celebrated aeronaut, born in Constance, Germany. He was educated at the Polytechnical School in Stuttgart and at the military school at Ludwigsburg. In the Franco-German War he was promoted to the rank of lieutenant-general. After many experiments with dirigible balloons, of which he was the inventor, he made his first flight from Berne to Lucerne in 1892. After this he made numerous models and improvements and in 1913 constructed a passenger airship which traveled from Baden-Baden to Vienna in eight hours, half the time required for the trip by train. A Zeppelin designed for trans-oceanic travel exploded in mid-air in 1913, destroying all on board. Zeppelins were much used in the World War, but did not fulfill the expectations of their makers as vehicles for bombing or scouting expeditions, being outstripped for war purposes by the lighter and swifter aeroplane. See FLYING, STORY OF.

ZERO, in mathematics, a symbol (0) denoting the absence of quantity or value; also, the symbol of an infinitesimal quantity. The same term is used to represent the point from which measurement is recorded on a scale. It is also used on thermometers. In this connection, however, zero does not denote temperature. On centigrade thermometers it indicates the freezing point of water; on the Fahrenheit scale it indicates 32° below the freezing point. Entire absence of heat, scientists agree, is represented by a temperature of 273 degrees (C.) below zero. See THERMOMETER.

ZEUS, *zuse*. See JUPITER.

ZEUXIS, *zuke'sis*, a famous Greek painter, probably born at Heraclea, on the Euxine, about 450 B. C. Time has effaced his masterpieces—*Hercules Strangling the Serpent*, *Jupiter among the Gods*, *Marsyas Bound*, *Pan and Helen*—which were the admiration of ancient critics. Zeuxis was a contemporary of the celebrated painter Parrhasius. See PAINTING.

ZINC, *zink*, or **SPELTER**, a metallic element, in appearance resembling lead but much harder than the latter metal and about one-third as heavy. At 212° it becomes malleable, at 302° it can be drawn out into fine wire. It is obtained from ores, and is one of the most useful metals known. The principal zinc ores are the carbonate, or *Smithsonite*; the oxide, or *sincite*; the hydrated silicate, or *calamine*; and the sulphide, or *sphalerite*, commonly called *zinc blende*. From the last most of the zinc of commerce is obtained. Deposits of zinc ore occur in most of the countries of Europe, in the United States the ores are found chiefly in Missouri, Kansas, New Jersey, Pennsylvania, Wisconsin, Tennessee and Arkansas. British Columbia is a source of supply. The Missouri and Kansas mines are the most important in America, producing about sixty per cent of the country's total annual output of 400,000 tons. Zinc is known in the trade as *spelter*.

Commercial zinc is produced chiefly by a smelting process. The ore is roasted; the oxide thus set free is heated with charcoal in earthen pipes, and the powder is reduced to a liquid in iron crucibles. Zinc is marketed in the form of sheets and small bars. It is employed in the arts, especially in the manufacture of brass, German silver and other alloys, and in making printing plates for etchings. It is also used in making the positive plates for electric batteries, in galvanizing iron sheets for roofing and iron wire for telegraphs, in lining tanks and in protecting woodwork from the heat of stoves.

Among the most important commercially of the compounds of zinc are *zinc chloride*, a compound of zinc and chlorine, used in medicine as a caustic, a disinfectant and a deodorizer. It is a preservative of timber, the chloride solution being forced under pressure into the pores of the wood. Railway ties are treated in this way. The same compound is also used to add weight to cotton goods. *Zinc sulphate*, formerly known as *white vitriol*, is a white powder used in dyeing and calico printing, in the manufacture of varnishes and drying oils, and in the preparation of zinc white (used in making white paint for interiors) and other zinc compounds.

ZINC ETCHING, a plate for the reproduction in printing of drawings or lettering in ink, also the process by which it is made,

sometimes called the line-cut process. A photograph on glass is made of the drawing, and the negative, reversed, is clamped to a highly-polished plate of zinc which has been coated with wax or some other substance to protect it from the action of acid. The zinc plate is then subjected to electric light or to sunlight till the drawing is transferred to the sensitized surface, the lines are etched by means of a corrosive acid, and the plate is nailed to a block to make it the same height as type. Zinc etchings are quickly and inexpensively made, and for this reason are commonly used in the illustration of newspapers and many books. For the reproduction of photographs and other pictures, in which it is necessary to preserve the shading, the more complex halftone process must be used. See *HALFTONE*, *PHOTOGRAPHY*.

ZINNIA, a genus of plants belonging to the family *Compositae*. There are sixteen species, native to Mexico and the Southwestern United States. *Zinnias* bloom freely all summer, and thrive best in a rich loam with sunny exposure. The garden *zinnia*, with single and double flowers of many shades of red and yellow, is the best-known species. The stem is stiff and hairy, and grows to a height of one to two feet. Each of the several branches is topped by a single flower head made up of many florets. When successfully cultivated, the *zinnia* is a showy plant with vivid scarlet, crimson, yellow and other hues. It does not always turn out well, however, as the colors sometimes are muddy. The flowers lack pleasing fragrance.

ZION. See *JERUSALEM*.

ZIONIST MOVEMENT, or **ZYONISM**, the most recent world movement among the Jews arising largely from persecutions of them in various countries and having as its object the reestablishment of a Jewish state in Palestine. Ever since Jerusalem was wrested from the Jews by Rome (see *JERUSALEM*), the Hebrew people have hoped to recover this land of their early fathers, and at various times Zionist agitations have been set on foot.

By far the most significant of these was started in the last years of the nineteenth century. Unlike earlier Zionist movements which sought primarily to gain possession of the Holy City, the idea behind this one was practical and political, as well as religious, and was an attempt to solve the

problem of persecuted Jews in many lands by finding a home for them where they might enjoy some form of self-government. This idea found expression in a pamphlet written in 1896 by Dr. Theodore Herzl, a Vienna journalist. Interest in the movement led to an international Zionist congress at Basel, Switzerland, in the following year.

The congress discussed means for obtaining governmental grants as a necessary preliminary to establishing settlements of Jews in Palestine. Subsequent congresses provided for the establishment of a national fund, and about \$2,000,000 was collected from Jews throughout the world to promote the project. Negotiations were started with a view to making Palestine a tribute-paying state under the suzerainty of Turkey, and when the plan failed an attempt was made to secure a grant of territory from Great Britain in the vicinity of the Holy Land. This also was without fruition, and the offer by Great Britain in 1913, of the East Africa Protectorate as a site for a Jewish colony, was wrathfully rejected by the Jews, who refused to accept any nationalist plan which did not embrace the traditional idea of Palestine regained.

Within recent years the Zionist leaders have been chiefly interested in developing the physical resources of Palestine and in ameliorating the condition of Jews already there, as well as encouraging mass immigration. This has resulted in the emigration of many Russian and Rumanian Jews to Palestine and the establishment of self-governing colonies there. The way has been opened to promote agriculture and the trades. Schools began to flourish, and a banking system was inaugurated. The Hebrew language was revived. The World War stopped further immediate development; at that time Palestine contained about forty colonies, with a total population of about 55,000.

The outcome of the World War made the establishment of a Jewish state in Palestine a near possibility. In December, 1917, the British captured Jerusalem, and before the close of the war all Palestine had been freed from Turkish rule.

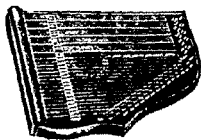
Early in 1918 a Zionist commission was sent from England to Palestine, the American Zionist organization providing most of the funds for its activities. A legion of Jewish young men from various countries was

formed to aid the movement, all being volunteers.

Palestine remained under British military control until 1920, and was then placed under mandate to Great Britain, and a civil government was established. Under British protection, Jewish immigration has been fostered. The hostile Arab majority presents a grave problem, and is retarding progress. A Jewish city, Tel-Aviv, has grown to considerable size and importance (population, 46,116 in 1931).

ZIRCONIUM, a metallic element occurring either in the form of a black powder or as gray crystals. It was discovered in 1789 by Klaproth, in combination with silica, in the mineral known as zircon. Its use is very limited. The powder combined with oxygen forms the dioxide known as zirconia, used in making mantles of Welsbach lights and Nerst lamps.

ZITHER, a common, stringed musical instrument, especially popular in Germany and the Tyrol. About thirty gut and wirebound silk strings are arranged horizontally on a frame over a wooden sounding board. The instrument is placed on a table or on the knees.



ZITHER

The strings are plucked by the fingers of the right hand and with the thumb the latter capped with a metallic plectrum.

ZODIAC, the zone or belt of the celestial sphere extending eight degrees on each side of the ecliptic, or plane of the sun's center containing the earth's orbit. It was divided by early astronomers into twelve sections of thirty degrees each, and the constellations within the respective sections came to be designated, for brevity's sake, by certain signs.

The twelve signs of the zodiac are Aries (ϖ), the Ram; Taurus (τ), the Bull; Gemini (II), the Twins; Cancer ($\var�$), the Crab; Leo (Q), the Lion; Virgo (MP), the Virgin; Libra (=), the Balance; Scorpio (M), the Scorpion; Sagittarius (r), the Archer; Capricornus (v), the Goat; Aquarius (=), the Waterman; Pisces (x), the Fishes.

ZODIACAL LIGHT, a nebulous light which appears in the west after sunset and

in the east before sunrise. It is triangular in shape, with base resting on the horizon and apex at varying heights. In the tropics it is visible the year round and is as distinct as the Milky Way. In middle latitudes it is seen in the winter and spring in the evening, and at dawn from September to spring. It is believed by some astronomers to be the reflection from a multitude of meteorites revolving about the sun.

ZOLA, *zo lah'*, **EMILE** (1840-1902), a noted French author. He had published several novels and won considerable notice before beginning, in 1869, his great series in twenty volumes, recounting the complete story of an imaginary French family under the Second Empire. The entire work is known as *The Chronicle of the Rougon-Macquart Family*. These books, like so many of Zola's other works, deal largely with the dark side of



EMILE ZOLA

life, with crime and vice, and picture vividly and accurately certain phases of Parisian Society. Some of the titles in the series are *The Fortune of Rougon*, *The Curé*, *The Conquest of Plassans*, *the Abbé Mouret*, *Eugène Rougon* and *His Excellency*. Of his later works the most important were the two series, *Lourdes*, *Rome*, *Paris*, and *Fruitfulness*, *Labor*, *Truth* and *Justice*, thus last unfinished at his death.

Zola championed the cause of Captain Dreyfus, an officer in the French army unjustly accused of selling military secrets to Germany. He was forced to flee the country, but in 1899, after the acquittal of Dreyfus, he returned, and he died at Paris three years later.

ZOLLVEREIN, *tsoll'fe rine*, a German word meaning *customs-union*, was a German commercial union formed under the leadership of Prussia, in 1818. At the beginning of the last century what is now Germany was made up of numerous small independent states, each with its own tariff regulations. This complicated system restricted commerce, and in 1818 an agreement was reached whereby internal customs were abolished. All import duties were collected on a common frontier, and the revenue thus received

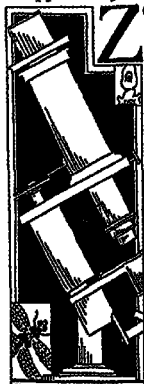
was divided among the several states according to population. Three unions were formed, the North German, the Middle German and the South German unions, and in 1834 these were merged in a single union, or Zollverein. In 1871, when the German Empire was formed, the constitution provided that the Zollverein was to include the entire empire, with the exception of the free cities of Bremen and Hamburg. Later these, too, with the exception of a part of Hamburg, were included.

ZONE, in geography, one of the five great divisions of the earth, bounded by imaginary circles, which are parallel to the equator. The zones are named according to the prevailing temperature in each. The torrid zone extends 23° 30' north and 23° 30' south of the equator, thus being 47° wide. It is bounded on the north by the Tropic of Cancer and on the south by the Tropic of Capricorn. The north temperate zone extends from the Tropic of Cancer to the Arctic Circle and is 43° wide. The south temperate zone extends from the Tropic of Capricorn to the Antarctic Circle and is of the same width as the north temperate zone. The north frigid zone extends from the Arctic Circle to the North Pole, and the south frigid zone from the Antarctic Circle to the South Pole. While the parallels named mark the arbitrary boundaries of these zones, the climate of each merges so gradually into that of the zones adjoining upon either side, that no distinct climatic boundary exists between them.

Related Articles	Consult the following
Antarctic Circle	for additional information
Arctic Circle	Equator
Climate	Geography
	Tropics

ZOOLOGICAL, *so o loj's cal*, **GARDEN**, or **ZOO**, a park or enclosure where living animals are kept for exhibition. The Jardin des Plantes, in Paris, founded in 1804, was the first of such establishments, and the number has increased steadily, until at present many of the large cities in Europe and the United States maintain zoological collections of some sort. The gardens at London, Antwerp, Berlin, Vienna and Amsterdam are among the best in Europe. Most of the European collections are maintained by societies or corporations, the city merely furnishing the land. In the United States many cities have municipal "zoos," that at Bronx Park, New York City, being the largest and

finest in the world. The zoos of Lincoln Park and Brookfield, Chicago, and Highland Park, Pittsburgh, are also important, and Philadelphia, Cincinnati and Washington have zoological gardens. The National Zoological Park at Washington is under the control of the Smithsonian Institution and is supported by the government.



ZOOLOGY, *so o'lojy* We are all interested in animals, and like to watch them and to learn about their habits, but it does not often occur to us that such an interest has any connection with a science with so forbidding a name as zoology. And indeed zoology is much more than a knowledge of the looks and the habits of animals, in its various branches it considers the form and structure of organisms, their activities and their relations to

one another and to their surroundings.

To be sure, one may be happy and prosperous and fairly well equipped mentally if zoology be never studied, but certain facts relating to this science should be known by everyone. An elementary knowledge of the subject will save one from frequent embarrassment. For instance, if the statement be made that a whale and a man belong to the same class of animals, the uninformed person may be tempted to deny the fact. The household cat and the lion, king of beasts, are related, and only a little study is required to trace the relationship and to learn why scientists so classify them.

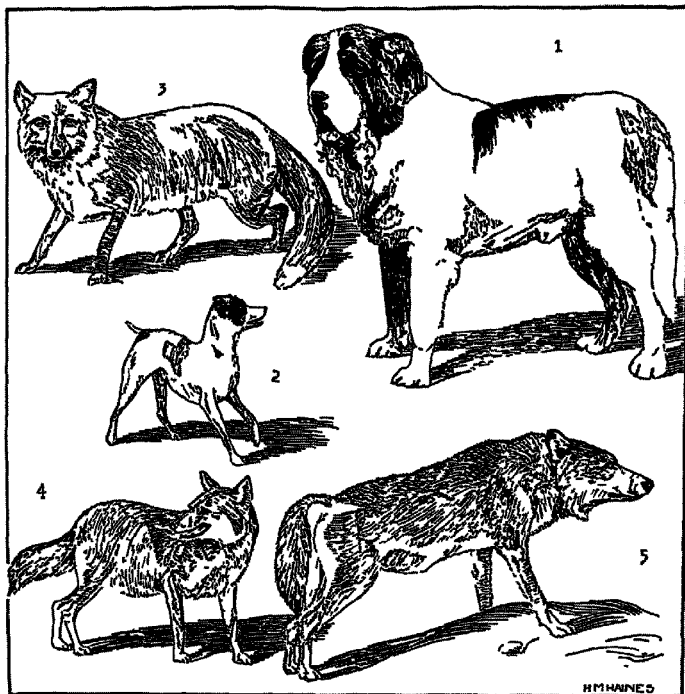
The fact of these relationships has not always been known even to scientists, indeed, it is only in comparatively recent times that exact classifications of animal life have been made. Far back in ancient times, Aristotle made studies of animal life, dissected specimens, and made a certain classification, and his work stood for the most part unquestioned until after the Middle Ages. Some of it is accepted to-day, modern scientific investigation having confirmed the theories of the old Greek scholar.

Plants and Animals. The word *biology* means *science of life*, and the science of

biology treats of all forms of life, plant and animal. The fact that thus one science of life is composed of two distinct sciences, one of which—botany—treats of plants, while the other—zoology—treats of animals, indicates that the two forms of life are distinct. Indeed, it seems to be a very simple matter to distinguish members of the plant world from animals. Usually it is easy; a bee on a flower, an ox grazing in a field of grass, a moth fluttering on a blossom are instantly classified. But there are among plants some with very simple organisms and among the lowest species of animals some whose organisms are not in the least complex; to tell which is plant and which is animal is difficult indeed. One may say that the animal is alive and can move, while the plant, though alive, has no power of motion. This is an error, as witness the sudden closing of the Venus's fly-trap (which see), when it entraps its food, the turning of some flowers so they will continually face the sun, and the twining of tendrils around sticks and strings. Most green plants live on inorganic matter—on carbon and carbonic acid gas—and this is what gives them their greenness. But some plants, the fungi, live on organic matter and are not green, and exist because they are able in a wonderful manner to change the organic matter they select for food into inorganic substance. When a plant substance is single-celled and has cell walls in many respects like those of single-celled animals, it is impossible for the wisest scientist to tell them apart.

What All Animals Need. A fish that has been taken from the water and left high and dry on the shore will not live long, a cat or a bird or a man will die in even shorter time if held under water. This does not mean, however, that a fish and a land animal breathe different substances—that one breathes water and the other breathes air. They both require the same substance, and cannot live without it; that substance is air. But a fish is so formed that it draws the air it needs from the water, which a land animal cannot do. No animal, from the lowest to the highest, can live without air, or rather without that element of air which is called oxygen.

Relationships. Earlier in this discussion brief reference was made to some of the odd relationships that exist in the animal world. This is one of the most interesting topics with which zoology deals. The word *cat* ordinarily



THE DOG FAMILY

1 Saint Bernard 2 Fox terrier 3 Fox 4 Coyote 5 Wolf

means to us the little animal, gray or white or black, which plays about our homes, but after we have made the acquaintance of this science, the word cat gains a new meaning. It means the powerful lion, the lithe tiger, the graceful leopard, the sharp-eyed lynx—all wild, ferocious beasts that seem as different as possible from the household pet which we are used to thinking of as the most domestic of the animals. (See illustration, page 721)

The dog family is not so surprising. The wolf, the dog, the fox, the coyote look much alike, despite their numerous points of difference. If we can imagine ourselves as never having seen any of the animals before and then as being shown a wolf, a colts and a little black-and-tan, we will admit that we

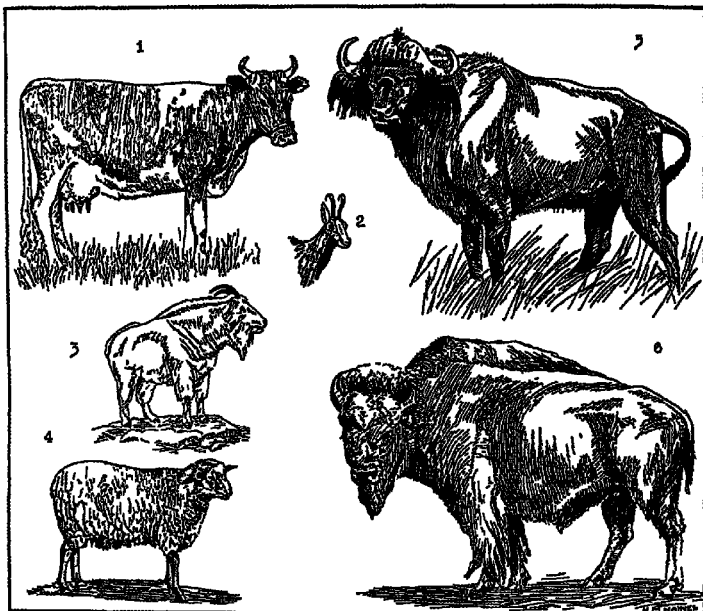
should be likely to assume that the wolf and the colts were more closely related than the colts and the little terrier. We have all watched cattle and sheep grazing in a field, but it has probably never occurred to any of us to think of them as belonging to the same family. And yet a study of the picture of the dog family, shown in this article, proves not only these animals belong to the ox family, but the goats, buffalo and the bison of our western plains as well.

The bobwhite is a plain little bird, dressed in quiet colors. Who would ever suspect for a moment that he belongs to the same family as the great bronze turkey or the gorgeous peacock? He may, however, claim such a relationship, and the guinea fowl, the partridge and our barnyard hens and roosters

are members of the same family, together with the bird which has given its name to the whole group—the pheasant.

Resemblance. Among the most interesting of the many wonderful facts about the animal world with which zoology acquaints us is what is known as resemblance or mimicry. We have perhaps looked, in a zoological garden, at the bears—the grizzly bear, the cinnamon bear, the polar bear, and

he ever be able to come close to his prey unobserved? But the polar bear harmonizes with his surroundings, and is almost unnoticeable against the white background. In the forest regions or mountain regions a white bear could be seen a long way off, while the darker-haired animals are much less conspicuous. The foxes and hares of the polar regions are pure white also, while a certain kind of weasel which lives in a region where



THE OX FAMILY
1 Cow 2 Head of antelope 3 Rocky Mountain Goat 4 Sheep 5 African
buffalo 6 Bison, or American buffalo

we have known that the polar bear came from the arctic regions where snow covers the ground during most of the year, while the other bears come from more temperate regions—regions of forest and rock and mountain. But probably it never occurred to us that there was any particular reason for the differences in color.

Let us imagine, in the region of perpetual snow, a bear creeping upon his prey. He is a huge bear, and stands out with startling distinctness against the white ground. Would

snow covers the ground during only a part of the year changes from its summer coat of reddish brown to a winter coat of white. See **FUR AND FUR TRADE.**

There is one example of this changing of colors with which we are all familiar; that is in the little lizard which we call the chameleon. Its ability to make its color match that of its surroundings is commonly overestimated—it cannot change to any or every color; but it does grade through various shades of brown and green.

Questions on Zoölogy

NOTE—For additional questions on animal life refer to *Nature Study*. In that department will also be found interesting outlines on animals, birds, fish, insects, etc.

What is zoölogy?

What is the derivation of the term zoölogy?

What does "cold-blooded" signify when applied to animals?

What are the difficulties of classification in the case of the lowest forms of animal life?

What are the causes of the migratory habit of animals?

Which are the more abundant, the higher or lower forms of life? Why?

What animal is born without a covering? Why?

What are the most useful animals to man for domestic purposes?

What animals are known as ruminants?

What parts of the deer are of commercial value?

How are flesh-eating animals equipped to eat their food? To obtain it? They are satisfied with one meal at a time, eaten rapidly, why?

Why does live stock have to graze so continuously?

What is the difference between an animal and a plant?

Name some of the many ways in which nature has provided for the safety and preservation of wild animals?

What animals produce the most expensive furs?

What do you mean by vertebrates?

In general, what one part of wild animals is of commercial value?

Name the domestic animals in which you think to be the order of their usefulness

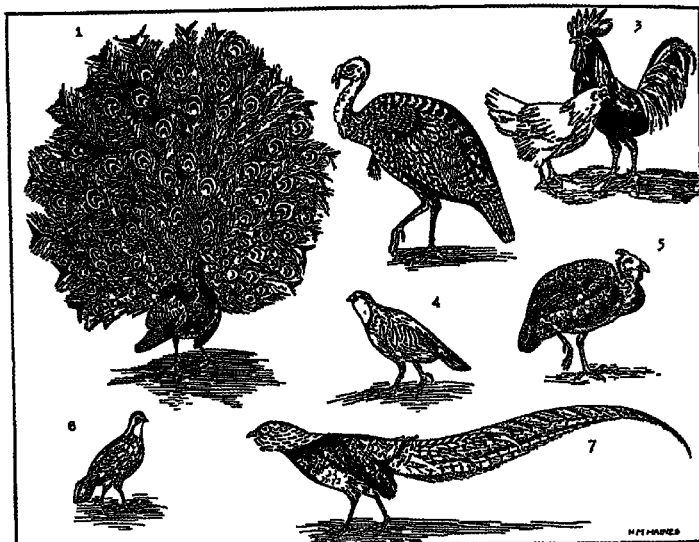
itself, there is the greenleaf insect, which has broad, leaf-green wings, which show the veins, the markings and even the discolorations of leaves, and most wonderful of all, there is the huge dead-leaf butterfly. The upper side of this remarkable butterfly's wings are dark, with orange and purple markings, but when it settles on a branch to rest it folds its wings close over its back, hides its head, and looks so exactly like a withered leaf that even close scrutiny cannot always distinguish it. The dead-leaf color is there, the short tail which looks exactly like a leaf stalk, the midrib, the veins, and even the two colorless spots which resemble holes eaten out by insects.

There is one other type of resemblance or mimicry. This is seen in the case of the harmless, non-poisonous insects which imitate exactly in their color and markings certain poisonous insects which really differ from them widely. By this mimicry the harmless insects are saved from the birds which would otherwise devour them.

Protective Coloration and Mimicry
When we use the words mimicry and resemblance, we must constantly bear in mind one fact: that is, that there is no consciousness, no intention on the part of the mimic. The insect or animal does not voluntarily imitate.

The Struggle for Existence If all the animals that are born were to live, in a very short time the earth would be crowded to suffocation. For instance, it is stated that if all the eggs laid by the conger-eel were hatched, and every little eel grew and reproduced itself, it would take less than ten years for the sea to become solidly full of conger eels. It is clear that only a small proportion of the animals born survive. So fierce, indeed, is the struggle, that it is usually only by means of superior strength, cunning or agility or by means of some special protective device, such as the mimicry spoken of in the last paragraph or poisonous secretions, that animals can live and thrive. First there is the struggle within the species—fox fights against fox, and the stronger wins. Then there is the struggle with animals of other species, and finally with the conditions of life, or forces of nature. If in any given locality, only enough food exists for a certain number of animals, all above that number must starve or migrate. Innumerable birds, insects, fish, animals of all species die of starvation, many die from climatic condi-

Perhaps the most wonderful of these resemblances are shown among the insects. There is the insect known as the walking-stick, which, with its long, slender wingless body and its dull color looks so like a dead twig that when at rest it cannot be distinguished from the twigs to which it attaches



THE PHEASANT FAMILY

- 1 Peacock 2 Turkey 3 Domestic hen and rooster 4 Partridge 5 Guinea fowl
6 Bob white 7 Golden pheasant

tions, in settled parts of the country many are killed by man. By all of these means the animal population of the world is kept down. In most districts which are uninhabited, the number of a certain species of animals remains nearly constant, where man joins his destructive forces with those of Nature, the forms of wild life diminish rapidly.

Related Articles Consult the following titles for additional information

Amphibians (with list)	Invertebrates
Animal (with list)	Lamarck, Jean
Animal Intelligence	Baptiste
Arachnida	Linne, or Linnaeus
Arthropoda	Larva
Birds (with list)	Mammals (with list)
Carnivora	Marsupials
Cell	(with list)
Cephalopoda	Metamorphosis
(with list)	Mollusca (with list)
Cetacea (with list)	Molting
Chiroptera	Myriapoda
Coelenterata	Neuroptera
Crustacea (with list)	Orthoptera
Cuvier, George L.	Primates (with list)
Darwin, Charles	Protective Coloration
Echinoderms	and Mimicry
Ecdentata (with list)	Protoplasm
Egg	Protosoa
Evolution	Radiolaria
Feathers	Reptiles (with list)
Fish and Fisheries	Rodents
(with list)	Ruminants
Hemiptera	Scales
Hibernation	Ungulates
Horn	Vertebrata
Infusoria	Vorticella
Insectivora	Worms
Insects (with list)	Zoological Garden

Outline on Zoology The following outline contains the classification of animals generally accepted by the leading authorities during the past half century, or thereabouts. It has divided the animal kingdom into seven subkingdoms, each of these is divided into families, the families are divided into genera and the genera into species. The subkingdoms are distinguished by bold-faced type and Roman numerals.

I Protozoa (first animals)

- (1) Monera (single + substance)
- (2) Rhizopoda (from two Greek words meaning "root" and "foot")
- (3) Foraminifera (having an opening or orifice)
- (4) Radiolaria (so called because of the spiny projections which radiate from the center of the body)
- (5) Infusoria (so called because found in infusions after even brief exposure to air)

II Coelenterata (hollow intestines)

- (1) Medusae (so called because of the fringe supposed to resemble Medusa's locks)
- (2) Polyp (polypus meaning many-footed)
 - (a) Sponge
 - (b) Coral
 - (c) Sea anemone

III. Worms

- (1) Platyhelminthes (flat + worm)
 - (a) Flat-worm
 - (b) Tape-worm
 - (c) Fluke-worm
- (2) Nematelminthes (thread + worm)
- (3) Star-worms
- (4) Annelata (so called because of the ringed markings)
 - (a) Leech
 - (b) Earth-worm
 - (c) Sea-worm

IV Echinodermata (spring skinned)

- (1) Crinoides (lily + like)
- (2) Star-fish
- (3) Sea urchin
- (4) Sea cucumber

V Mollusca (soft body)-red animals)

- (1) Bivalves
 - (a) Oyster
 - (b) Clam
 - (c) Mussel
 - (d) Scallop
- (2) Cephalophora (head + to bear)
 - (a) Whelk
 - (b) Snail
- (3) Cephalopoda (head + feet)
 - (a) Squid
 - (b) Cuttle-fish
 - (c) Nautilus
 - (d) Octopus

VI Arthropoda (jointed-foot animals)

- (1) Crustacea
 - (a) Water-flea
 - (b) Shrimp
 - (c) Lobster
 - (d) Crab
 - (e) Barnacle
- (2) Myriopoda (numberless feet)
 - (a) Millipede (thousand feet)
 - (b) Centipede (hundred feet)
- (3) Arachnida (from the Greek word for spider)
 - (a) Spider
 - (b) Scorpion
 - (c) Mite
 - (d) Tick
- (4) Insects
 - (a) Thysanura (bristle tail)
 - (b) Dermaptera (skin + wings)
 - (c) Orthoptera (straight wings)
 - (1) Grasshopper
 - (2) Locust
 - (3) Cricket
 - (4) Katydid
 - (5) Cockroach
 - (d) Platyptera (flat + wing)
 - (1) White ant
 - (2) Bird-lie
 - (3) Bookworm
 - (e) Hemiptera or bugs half or semi + wing)
 - (1) Louse
 - (2) Squash bug
 - (3) Chinch bug
 - (4) Locust
 - (5) Cochineal (from the Latin word for scarlet)
 - (f) Neuroptera and allied groups (nerve + wing)

- (1) Dragon fly
- (2) May fly
- (3) Scorpion fly
- (4) Caddis fly
- (g) Beetles
- (h) Fleas
- (i) Diptera (two wings)
 - (1) Fly
 - (2) Mosquito
- (j) Lepidoptera (scaly wings)
 - (1) Butterfly
 - (2) Moth
- (k) Hymenoptera (membrane + wing)
 - (1) Bees
 - (2) Wasps
 - (3) Ants
 - (4) Grail-flies

VII Vertebrata (animals having vertebrae or backbone)

- (1) Fishes
- (2) Amphibians (from the Greek word meaning 'double life')
 - (a) Salamander
 - (b) Frog
 - (c) Toad
 - (d) Blindworm
- (3) Reptiles
 - (a) Lizards
 - (b) Snakes
 - (c) Turtles
 - (d) Crocodiles
- (4) Birds
 - (See detailed outline, page 455)
- (5) Mammals
 - (a) Duck-billed platypus
 - (b) Marsupialia (having a pouch)
 - (1) Opossum
 - (2) Kangaroo
 - (c) Edentata ('without teeth,' but the term is misleading as most of them have teeth)
 - (1) Sloth
 - (2) Ant-eater
 - (3) Armadillo
 - (d) Rodentia (gnawing)
 - (1) Rat
 - (2) Mouse
 - (3) Squirrel
 - (4) Porcupine
 - (5) Beaver
 - (6) Hare
 - (e) Insectivora (insect + to devour)
 - (1) Mole
 - (2) Shrew
 - (f) Chiroptera or bats (from words meaning hand and wing)
 - (g) Cetacea (from the Latin word for whale)
 - (1) Whale
 - (2) Porpoise
 - (h) Sirenia (like, sirens)
 - (1) Manatee
 - (2) Dugong (Malay word)
 - (i) Proboscidea or Elephants (be fore + to feed or graze)
 - (j) Ungulata (from ungula, a hoof)
 - (1) Odd number of toes
 - (a) Horse, ass,ebra
 - (b) Rhinoceros

Protista—One-celled animals

No definite shape, jelly-like substance, root-like projections of body for feet, with which they seize their prey and absorb it.

Copepodaria—Many-celled

- a. Simple organisms Capture food by long tentacles. No distinct circulatory system or body cavity Two types Those bell-shaped and cylindrical
- b. Examples Sponges, sea-anemones, coral, hydras, etc

Echinodermata. Sometimes called radiata

- a. Consists of five parts around a center Covering sometimes a hard shell, others soft and leathery Alimentary canal separate from body cavity
- b. 3,000 living species found in all seas—such as starfish, sea-urchin, etc.

Vermes—Worms

- a. Made up of joints or segments, head, tail, upper and lower surfaces, heart, nerves, etc.
- b. Many species, but all have same characteristics.

Mollusca. Sometimes called shellfish.

- a. Possess alimentary canal, distinct nervous system, digestive apparatus, mouth, gills, stomach, kidneys
- b. Examples Oyster, clam, cuttlefish, etc

Artropoda. Sometimes called arthropods.

- a. Possess well-organized nervous systems, usually have simple or compound eyes. Some species are parasites.
- b. Examples Insects, spiders, lobsters, crabs, etc

Vertebrates.

- a. Possess backbone Two cavities Upper containing brain, lower, heart, digestive organs, etc.
- b. Examples Mammals, reptiles, fishes, birds, amphibians etc.

General Facts

- 1 One-celled animals bear strong resemblance to lowest orders of plant life
- 2 This simple cell has the power to do all things necessary for its life
- 3 Higher formed animals have many cells, and whole acts of organs These vary in different animals but their functions in the same.
- 4 Animals require oxygen, while plants require carbons and.
- 5 Animal intelligence Many animals possess the senses of man—touch, sight, etc. Higher animals possess memory Animals draw inferences from what they see, but it is doubtful whether an animal can put together different facts and establish a conclusion

ANIMALS

ZOOLOGY

SUGGESTED FOR BLACKBOARD OUTLINE

- (2) Even number of toes
 - (a) Tapir
 - (b) Peccary
 - (c) Pig
 - (d) Hippopotamus
 - (e) Deer
 - (f) Sheep
 - (g) Ox and bison
 - (h) Camel
- (k) Carnivora (flesh + to devour)
 - (1) Aquatic
 - (a) Walrus
 - (b) Seal
 - (c) Sea lion
 - (2) Land
 - (a) Bear and racoon
 - (b) Mustelidae (from *mus-* tela, the Latin word for weasel)
 - (1) Otter
 - (2) Skunk
 - (3) Weasel
 - (4) Badger
 - (5) Mink
 - (c) Dog family
 - (1) Fox
 - (2) Wolf
 - (3) Dog
 - (d) Cat family
 - (1) Hyena
 - (2) Lynx
 - (3) Panther
 - (4) Leopard
 - (5) Tiger
 - (6) Lion
 - (l) Primates (from the Latin *primus* meaning first or highest)
 - (1) Lemur
 - (2) Marmoset
 - (3) Monkey
 - (4) Ape
 - (5) Man

ZORN, iorn, ANDERS LEONHARD (1860-1920), a Swedish artist, famed as a landscape and portrait painter, etcher and sculptor. He was born at Mora, of peasant parents. Zorn expected at first to devote himself wholly to sculpture, and to that end studied in Stockholm for six years, subsequently he took up etching and water color painting in London. His first oil painting, *Fisherman from Saint Ives*, was purchased for the Luxembourg Museum in 1888. Zorn's fame steadily increased with time, as he showed genius in all phases of art which he undertook. He became a foremost portraitist, showed a mastery of the technique of sculpture, and won equal fame as an etcher. His portraits include *King Charles of Sweden*, a study of himself (in the Uffizi), *Maya* and *The Toast*. Among his etchings is a remarkable series of portraits, including studies of Renan, Strindberg, France, Rodin and other celebrities. Notable

pieces of sculpture include a statue of *Gustavus Vasa*, *Faun* and *Nymph* and *Grandmother*.

ZOROASTER, zo ro as'ter, a teacher and reformer of ancient Persia, who formulated one of the chief religious systems of the world. It is not definitely known when he lived, but it was probably between 660 and 583 B. C. Legend associates with his life such supernatural phenomena as miracles, symbolic dreams, visions and temptations by an evil spirit. His teachings are embodied in the *Zend-Avesta*, the sacred book of the Parsis and Guebers, his followers at the present time. They embrace the idea of conflicting forces of good and evil in the world, and man's power to choose between them. Good thoughts, good words and good deeds form the watchword of the faith.

ZOUAVES, zohavz, or zo ahvz', originally a body of troops in the French army. It derived its name from a tribe of Kabyles inhabiting the mountain of Jurjura, in the Algerian province of Constantine. General Clausel, of the French army in Algiers, created, in 1830, two battalions of Zouaves, in which each company consisted of French and Zouaves in certain proportions, officers, subalterns and soldiers being selected from both. The zouaves, though retaining their Moorish dress, were armed and disciplined after the European fashion, and the battalions were recruited by voluntary enlistment.

The mixing of soldiers proved unsatisfactory, and after 1839 no more natives were recruited, though regiments of Algerian sharpshooters were formed of men of exceptional physique and courage. These regiments became an integral part of the French army, and won distinction not only in Africa, but also in the Crimea, Italy, Mexico, Tunis and Tongking. The Zouaves now in the French army are organized in three regiments of five battalions each, and are among the finest soldiers in Europe. A large force of these *Turcos*, as they are called, fought in the great war from 1914 to 1918.

In the United States during the Civil War some Northern regiments adopted the Zouave uniforms and were known as Zouaves. Most famous of these was a New York regiment, under the command of Colonel Ellsworth.

ZUIDER ZEE, z' der zee', a large, shallow arm of the North Sea, extending into the northwestern part of the Netherlands. The

reclamation of the land under the Zinder Zee and its transformation into a fertile province is one of the immediate projects of the Netherlands (see NETHERLANDS, pages 2512-13). The inlet consists of an oval inner portion, a horn-shaped outer portion and a narrow strait connecting the two. The area is about 2,000 square miles. Originally the inner portion was a lake, situated in a region of fens and marshes. In the thirteenth century severe storms caused an inundation of the North Sea and the submergence of large sections of land.

ZULUS, *soo'loos*, a warlike people of Bantu stock, inhabiting parts of South Africa. They support themselves chiefly by raising millet and breeding cattle. They live in thatched and plastered houses, supported by poles, which are beehive in form and arranged in large circles, enclosing the cattle pens. These communities, or villages, are called *kraals*. Pottery making, basket weaving, iron smelting and hide tanning are engaged in to a certain extent. The principal weapons are the assegai and the knobkurrn. Polygamy and wife purchase are customary. Chaka, the chief ruler during the first quarter of the nineteenth century, dominated South Africa from the Zambesi to Cape Colony. Cetewayo reigned from 1874 to 1878, and by his depredations he embroiled his people in war with England. Dinuzulu, his son, was crushed in 1879, but, as he continued to incite the natives to fighting, he was banished. The Zulus are gradually becoming civilized.

Zululand, *soo'loo land*, a region of South-eastern Africa, forming a part of the British province of Natal, to which it was annexed in 1897. Its area is about 10,450 square miles, and its population is about 230,000, the most of whom are natives. See NATAL.

ZUNI, *soo'nyee*, the popular name of a Pueblo Indian tribe which inhabits four pueblos, or villages, in New Mexico. The most important of these villages is also called Zuni. The Zuni, or Ashiwu, as they call themselves, have lived in the same locality for centuries, the Spanish explorers discovered them there in 1539, and missions were established later among them.

Zuni is built about a central court, surrounded by a continuous high wall which is scaled by ladders on both sides, intended originally for defense. The entrances to the

houses are on the roofs, and these also are reached by ladders inside and out. The people number about 1,600. They support themselves by cultivating the soil and raising stock.

ZURICH, *soo'rik*, SWITZERLAND, capital of the canton of Zurich and the largest city of the republic. It is on the Limmat, at the northern end of Lake Zurich, sixty miles northeast of Bern. The city is divided by the Limmat into two parts, known respectively as the Little City and the Great City. The old historical quarter of Zurich is picturesque with its steep, narrow streets and quaint dark houses, but the newer part of the city has handsome buildings and wide, attractive streets. Among the more noteworthy buildings are the old Wasserkirche, which now houses the municipal library, the old church known as the Grossmünster, of which Zwingli was pastor, the townhall, the university buildings and the Swiss national museum, the largest museum in Switzerland.

The educational institutions of the town include the university, with about 800 students, and the Federal Polytechnic, which has about 1,100 regular students, besides special students who attend lectures. Commercially and industrially, Zurich is of considerable importance. The silk industry is large, and cotton, paper and machinery are also manufactured. During the Middle Ages the town of Zurich was prosperous and important. It was the scene of the beginning of Zwingli's reformation. Population, 1930, 249,820.

ZURICH, LAKE, a lake of Switzerland lying mostly within the canton of Zurich, but extending for a short distance into Schwyz and Saint Gall. It is about twenty-five miles in length and from one-half to two and one-half miles in width, and is somewhat in the shape of a crescent. Its scenery is picturesque and charming, although not so imposing as that of some of the other lakes of Switzerland.

ZUYDER ZEE, *su'der se'*. See ZUYDER ZEE. **ZWINGLI**, *tsving'lee*, ULRIC or HULDERICH (1484-1531), an illustrious Swiss reformer. In 1506 he was ordained by the bishop of Constance, becoming in the same year pastor of the large parish of Glarus. His studies in the New Testament gradually led him to question many of the doctrines in which he had been trained, and by degrees he became known as an ardent reformer. As well as a

prominent patriot. He had no communication with Luther, but by 1518 he had begun a work in Switzerland very similar to that which had been started by the great German reformer. In 1522 he demanded of the bishop of Constance and all the governments of the confederation the abolition of the law imposing celibacy upon the priests, and his suggestions for one reform after another widened his breach with the Church.

In 1529 he went to Marburg, to confer with Luther and the other German reformers, upon the possibility of uniting the re-

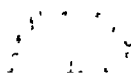
form movements, that a stronger resistance might be made to their opponents. Zwingli was willing to make concessions, but Luther objected to the fact that the religious movement in Switzerland was allied with a movement for civil reform, and this, together with their differing views on the Lord's Supper, prevented cooperation. In 1531, when open war broke out between the Catholic and the Protestant cantons of Switzerland, Zwingli accompanied the Zurich regiment as chaplain and was killed at the Battle of Kappel.

COMPLETE INDEX

In the pages which follow there is printed a carefully compiled Index of all topics which are treated in this set of books

In the minds of many people information regarding various phases of knowledge is contained only in special articles bearing black-face capital-letter headings. The general plan of THE EDUCATOR volumes provides the usual and familiar alphabetical arrangement of such titles. Every article bears such a heading, but there is a vast array of facts which, while of value, are not of themselves of sufficient moment to demand treatment in separate articles. Such bits of information are found in the body of discussions of thousands of related subjects, but they are not accessible on a moment's notice. There is needed, therefore, a system of reference which will disclose their positions in the volumes.

The present Index presents these very numerous subjects by page numbers, and points to the column where information regarding them will be found. The letter *a* after a number indicates the location of a fact in the first column of the page, the letter *b* locates it in the second column.



COMPLETE INDEX

A

- A, 1a, 2681b
A, (in music), 1a.
Al, Aal and AAL, 1a.
Anchen, 1a, 58a.
Aard-vark, 1a.
Aard-wolf 1b
Aaron, 1b
Abacus 2a.
Abalone, 2a.
Abbey, 2a.
Abbey, Edwin Austin 2b
Abbott, 5b
Abbotsford 2b, 3227a.
Abbott, Jacob, 2b
Abbott, John Joseph Caldwell, 3a.
Abbott, Lyman, 3a.
Abbreviations, 3b
Abdication, 1a.
Abdomen, 5a.
Abd-ul-Hamid II 5b
Abel, 6a.
Abelard, Pierre, 6a.
Abencrombie, James, 6a.
Aberdeen, John Campbell Gordon, 6a.
Aberdeen Scotland, 6b
Aberdeen, S D, 6b
Aberdeen, Wash, 6b
Aberdeen-Angus Cattle 723b
Aberation, 7a.
Abigail, 7a.
Abilene Tex., 7a.
Abiogenesis, 3390a.
Abolitionists, 7b
Abomey, 7b
Abominations Tariff of, 3516a
Aboirines, 285b
Aboukir 7b
Abraham, 7b, 406a.
Abrassives 8a.
Abruzzi, Prince Luigi Amadeo, 8a.
Absalom, 8a.
Absalom and Achitophel, 1147a.
Abscess, 8a.
Absinthe, 8b, 3947a.
Absolute Monarchy, 2382a.
Absolution, 8b
Absorbentia, 8b
Absorption 8b
Abstraction, 8a.
Abu-Abdul-Jah, 479b
Abu-Bakr, 3a, 165b, 2376b
Abukir, 7b
Abutlon, 9a.
Abydos (Asia Minor), 8a
Abydos (Egypt), 9a.
Abyssinia, 9b
Acacia, 11a
Acacia Royal, 3285b
Academus, 11a.
Academy 11a
Acadia, 11b, 1279a, 2616a.
Acanthus, 11b
Accent, 11b, 2683b
Accumulation, 12a.
Accolade, 808b
Accordion, 12a.
Accounting, 12b
Acetanilid, 12a.
Acetates, 12a.
Acetic Acid, 12a.
Acetylene, 12a.
Achaean, 13b
Achates, 14a.
Achilles, 14a, 1763b
Achroite, 3602b
Acid, 14a.
Acilinic Line 14b
Aconogaea, 14b
Aconite, 14b
Acoustics, 14b
Acra, 14b
Acropolis, 15a.
Acrostic, 15a.
Actaeon 15a.
Actinism, 15b
Action, 2873a.
Actium, 15b
Act of Union, 2669a.
Acts of the Apostles, 15b
Adam and Eve, 15b
Adam Bede, 1213b
Adam's Apple 2061a.
Adams, Charles Francis, 16a.
Adams, Charles Francis, Jr., 16a.
Adams, Charles Kendall, 16a
Adams, Henry, 16a.
Adams, John, 16b
Adams, John Quincy, 16b
Adams, Mass., 22a.
Adams, Maud Kikadden, 22a
Adam's Needle, 3972b
Adams, Samuel, 22a.
Adams, William Taylor 22b
Addams Jane, 22b, 1734b
Addax, 23a.
Addar, 23a.
Adding Machines, 235b
Addis Abeba, 23b
Addison, Joseph 23b
Addition at Sight, 179a.
Address, Forms of, 23b
Ada, George, 24a
Adelaide, South Australia, 24b
Aden, 24b
Aden, Gulf of, 24b
Adenoids, 24b
Adapta, 75b
Adelmont, 25a.
Adipose Tissue, 231b
Adirondack Mountains, 25a.
Adjective, 25b, 2050b
Adjutant (bird), 25b
Adjutant (military), 25b
Adjutant-General, 25b 235b
Adler, Felix, 25a.
Admetus, 25a, 75b
Administrative Law, 2067a
Administrator, 25b
Admirable Crichton, 287a.
Admiral, 25b
Admiral of the Navy, 1063a
Admiralty, 27a.
Admiralty Court, Canada, 27a
Adobe, 27a.
Adolescence, 27b
Adonis 192a
Adonis (botany), 27b
Adonis (mythology), 27b
Adoption, 28a.
Adrenalin, 28a.
Adrian (Pope), 28a.
Adrian, 28a.
Adrianople, Peace of, 2652b
Adrianople, Turkey, 28a.
Adriatic Sea, 28b
Adulteration, 28b
Ad valorem Duties, 1011b
Adventists, 29a.
Adverb, 29b
Advertising, 29b
Adventures of Sherlock Holmes, 1110a.
Ads, 30a.
Aegean Sea, 30a.
Aegia, 30a.
Aeneas, 30a.
Aeneid, 30b, 3756a.
Aeolus, 31a.
Aerial Bridge, 557a.
Aerostatic Press, 51a.
Aeschines, 51a.
Aeschulapian, 31b
Aeschylus, 31b
Aesir, 2461b
Aesop, 32a.
Aesna, 1265a.
Aidavit, 32a
Affinity (chemistry), 32a
Affinity (relationship), 3046a
Affirmation, 2627b
Afghanistan 22b
Afghan War, 1734a.
Africa, 33b
African Methodist Episcopal Church, 32b
Agamemnon, 42b, 1763a, 1829a, 2453a
Agaric, 42b
Agassiz, Alexander, 42b
Agassiz, Louis John Rudolph, 42b
Agassiz, Mount, 43a.
Agassiz Association, 43b
Agate, 42b
Agave, 43b
Age (law), 43b
Age, 44a
Age of Ice, 1514b
Age of Man, 44a
Age of Pericles, 271a
Age of Reason, 2701a
Agincourt, 44b
Aginia, 1542b
Agnomen, 2467a
Agnosticism, 44b
Agnostics, 1527b
Agnus Dei, 44b
Agouti, 44b
Agra, 45a
Agraphia, 144a
Agrarian Laws, 45a
Agricola, Gnaeus Julius, 45a, 3497a
Agriculture, 45b
Agriculture, Department of, 50b
Agricultural College, 51b
Agricultural Colleges, Canadian, 51b
Agricultural Experiment Station, 52a
Agriculture in the United States 3532a
Agrimony, 52a
Agrippina, 2507a
Agua, 5b, 2229a
Aguaiente, 2505b
Agua Calientes Mexico, 52b
Aguinaldo, Emilio, 52b, 2519a.
Agulhas, Cape, 52a
Ahab, 52a, 419a.
Ahasuerus, 52a, 424a
Ahar, 52a.
Ahasiah, 52a
Ahmed Mirza, 2796a.
Aida, 52a, 3756a
Aid-de-Camp, 52a
Aimmiller, Max Emanuel, 53b
Aino, 53b
Air, 53b
Air, Deplomaticated, 2695b
Air Brake, 54a
Air Cells, 54b

The letter a, after a number, indicates column 1; the letter b, column 2

- Air Compressor, 54b.
 Airedale, 54b.
 Air Engine, 55a.
 Air Gun, 55a.
 Air Plants, 55a.
 Air Pump, 55a.
 Aisne, Battles of the, 56a, 3915b, 3917b.
 Aisne River, 56a.
 Aix-la-Chapelle, Congress of, 56b.
 Aix-la-Chapelle, Germany, 56a.
 Aix-la-Chapelle, Treaties of, 56b.
 Ajaccio, Corsica, 966b.
 Ajax, 56b.
 Akka, 57a.
 Akri, 15b.
 Akron, Ohio, 57a.
 Alabama, 57b.
 Alabama, The, 62a.
 Alabama, University of, 62b.
 Alabama River, 62a.
 Alabaster, 62b.
 Aladdin, 62b.
 Alameda, Calif., 63a.
 Alamo, The, 63a, 3183a.
 Aland Islands, 63b.
 Alaric I, 63b, 1540a.
 Alaric II, 63b.
 Alaska, 64a, 3044b.
 Alaska-Sable, 3320b.
 Alaska-Yukon-Pacific Exposition, 68b.
 Albacore, 3645a.
 Albania, 69a.
 Albany, Ga., 69a.
 Albany, N. Y., 69b.
 Albany Convention, 70a.
 Albatross, 70b.
 Albemarle Sound, 71a.
 Albert Edward Nyanza, 74b.
 Albert I, 71a.
 Albert Nyanza, 74b.
 Alberta, 71b.
 Albigenses, 74b.
 Albinos, 74b.
 Albion, 744b.
 Albumen, 74b.
 Albuminoids, 1096b.
 Albuquerque, N. M., 75a.
 Alburnum, 75a.
 Alcazar, 3263b.
 Alcestis, 75b.
 Alchemy, 75b.
 Alcibiades, 75b.
 Alcohol, 76a, 139a.
 Alcoholism, 76b.
 Alcoran, 1993b.
 Alcott, Amos Bronson, 77a.
 Alcott, Louisa May, 77a, 3026a.
 Alcylene, 2872b.
 Aiden, Henry Mills, 77a.
 Aiden, Isabella McDonald, 77b.
 Aiden, John, 77b, 976b.
 Alder, 77b.
 Alderman (politics), 77b, 829a, 2434a.
 Alderman, Edwin Anderson, 78a.
 Alderney, 78a.
 Aldershot, Eng., 78a.
 Alder Tannin, 3512a.
 Aldrich, Nelson Wilmarth, 78a.
 Aldrich, Thomas Bailey, 78b.
 Ale, 78b.
 Aleppo, 78b.
 Aleutian Islands, 78b.
 Aleuts, 79a.
 Alewife, 79a.
 Alexander (Popes), 79a.
 Alexander, Prince (Serbia), 3258b.
 Alexander (Scottish kings), 79b.
 Alexander I, 79b.
 Alexander II, 79b, 3143a.
 Alexander III, 80a, 3143a.
 Alexander the Great, 80a.
 Alexandria (Queen), 81b.
 Alexandria, Egypt, 82a.
 Alexandria, La., 82b.
 Alexandria, Va., 82b.
 Alexandrian Age, 82b.
 Alexandrian Library, 83a.
 Alfalfa, 83a.
 Alfalfa Weevil, 3842b.
 Alfieri, Vittorio, 84b.
 Alfilaria, 1491a.
 Alfonso XIII, 84b, 3374b.
 Alfred the Great, 85a.
 Algae, 85b.
 Algarrobin, 1158b.
 Algebra, 85b.
 Algiciras, 93a.
 Alger, Horatio, 93a.
 Algeria, 93a.
 Algiers, Algeria, 94a.
 Algea Bay, 94a.
 Algol, 94a.
 Algonkian System, 94b.
 Algonquian Indians, 94b.
 Algonquin Park, 94b.
 Alhambra, The, 95a, 1846a.
 Alias, 95a.
 Alice's Adventures in Wonderland, 95a, 1088b.
 Alien, 95a.
 Alien and Sedition Laws, 95b.
 Alimentary Canal, 95b.
 Alimony, 1086a.
 Alizarin, 95b.
 Alkali, 95b.
 Alkaloid, 96a.
 Allah, 96a.
 Allah, The Garden of, 1683a.
 Allahabad, India, 96a.
 Allan, Hugh Montagu, 96b.
 Alleghany Mountain, 96b.
 Allegheny River, 96b.
 Allegory, 97a.
 Allen, Ethan, 97a, 3579a.
 Allen, Florence E., 97a.
 Allen, Grant, 97b.
 Allen, James Lane, 97b.
 Allentown, Pa., 97b.
 Alliance, C., 98a.
 Alligator, 98a.
 Alligator Pear, 98a.
 Alligator-snapper, 3331b.
 Allison, William Boyd, 98b.
 Alliteration, 99a.
 Allopathy, 99a.
 Allotropy, 99a.
 Alloy, 99b, of steel, 3418b.
 All-Saints' Day, 99b.
 All-Souls' Day, 99b.
 Allspice, 99b, 2553b.
 Allston, Washington, 100a.
 Alto, 3311b.
 Alluvial Plain, 2864b.
 Alluvium, 100a.
 Alma Mater, 100a.
 Almanac, 100a.
 Almandine, 100b.
 Alma-Tadema, Lawrence, 101a.
 Almond, 101a.
 Aloe, 101a.
 Aloes Wood, 101b.
 Alpaca, 102a.
 Alpena, Mich., 102a.
 Alpha and Omega, 102a.
 Alphabet, 102b.
 Alps Mountains, 103a.
 Alsace-Lorraine, 103b, 1390a.
 Alesia, 880b.
 Altai Mountains, 104b.
 Altdorf, Switzerland, 104b.
 Altgeld, John Peter, 104b.
 Alton, Ill., 105a.
 Altona, Germany, 105a.
 Altoona, Pa., 105a.
 Alto Relief, 1219b.
 Alto-Relievo, 105b.
 Altruism, 105b, 1186b.
 Alum, 105b.
 Alumina, 105b.
 Aluminum, 106a, 767b.
 Aluminum Bronze, 570a.
 Alum Root, 106b.
 Alva, Ferdinand Alvarez de Toledo, 106b.
 Alverstone, Lord, 107a.
 Amadis of Gaul, 3371b.
 Amalgam, 107a.
 Amara Society, 107a.
 Amaranth, 107b.
 Amarillo, Tex., 107b.
 Amariis Family, 107b.
 Amati Family, 107b.
 Amazon River, 108a.
 Amazons, 108b.
 Ambassador, 108b.
 Amber, 109a.
 Ambergris, 109a, 3856b.
 Amber Mica, 2661b.
 Ambrogio di Bon Doni, 1513b.
 Ambrose, Saint, 109a.
 Ambrosia, 109a.
 Ambulance, 109b.
 Amendment, 109b.
 Amendments to the Constitution, 933a.
 America, 110a.
 America (hymn), 110a.
 American Association for the Advancement of Science, 110b.
 American Beauty, 110b.
 American Fabius, 1290a.
 American Flag, Story of the (outline), 3558b.
 American Goldfinch, 110b.
 Americanisms, 111a.
 American Legion, 112a.
 American Lion, 2726b.
 American Literature, 2121b.
 American Party, 2890a.
 American Rugby, 1368b.
 American Red Cross, 3035b.
 American University, 112a.
 Americus, Ga., 112a.
 Americus Vesputius, 112b.
 Amethyst, 112b, 461a.
 Amharic, 9b.
 Amherst, Nova Scotia, 112b.
 Amherst College, 112b.
 Amiens, France, 113a.
 Ammon, 113b.
 Ammonia, 113b, 139a.
 Ammonite, 113b.
 Ammonium, 113b.
 Ammunition, 113b.
 Amnestic, 114a.
 Ammon, 113b.
 Amoeba, 114a.
 Amos, 114b.
 Amoy, China, 114b.
 Ampere, Andre Marie, 114b.
 Amphibia, 114b, 139b.
 Amphibole, 1720a, 2506a.
 Amphibrachic Meter, 2311b.
 Amphictyonic Council, 115a.
 Amphion, 115a.
 Amphitheater, 115a.
 Amputation, 115b.
 Amritsar, India, 115b.
 Amsterdam, Netherlands, 115b.
 Amsterdam, N. Y., 116a.
 Amulet, 116a.
 Amundsen, Ronald, 116b, 2606a, 3366b.
 Amu River, 116a.
 Amur River, 116b.
 Amylopsin, 2725b.
 Anabaptists, 117a.
 Anabasis, 3955b.
 Anaconda, 117a.
 Anaconda, Mont., 117a.
 Anacreon, 117a.
 Anacreon in Heaven, 3407a.
 Anaemia, 117a.
 Anagram, 117b.
 Analysis, 117b, 2280a.
 Analytical Geometry, 2280a.
 Ananias, 118a.
 Anarchism, 3335a.
 Anarchists, 118a.
 Anatolia, 3650a.
 Anatomy, 118a.
 Ancestor Worship, 118b.
 Anchor, 118b.
 Anchovy, 119a.

The letter a, after a number, indicates column 1; the letter b, column 2.

- Ancient History, 1694a
 Ancient Mariner, Rime of the, 71a, 119a 878b
 Ancient Order of United Workmen, 119a
 Ancient Rome, 3096a
 Ancient Theaters, 3555b
 Andalusia, 3741a
 Andamans, 119b
 Andersen, Hans Christian, 119b
 Anderson Ind., 120a
 Anderson, Marie Antoinette, 120a
 Anderson, Robert 120a
 Anderson, S. C., 120a
 Andersonville Ga., 120b
 Andes Mountains, 120b
 Andorra, Republic of, 121a
 Andover, Mass., 121b
 Andre, John, 121b
 Andree, Solomon August, 121b
 Andrew, 122a
 Andrews, Elisha Benjamin, 122a
 Andromache, 122a
 Andromeda, 122a
 Andros, Edmond, 122b 757b
 Androsceggin River, 122b
 Anemograph, 122b
 Anemometer, 122b
 Anemone, 123a
 Aneroid Barometer, 345a
 Anesthetic 123a
 Angel, 123b
 Angel Fish, 123b
 Angelico, Fra, 124a
 Angell, James Burrill, 124a
 Angelus, 124b, 244b, 2707b
 Angina Pectoris, 124b
 Angiosperms, 124b, 517a, 518b
 Angie, 125a
 Angler, 125a
 Angles, 125b
 Anglerworm, 1169b 1467b
 Anglican Church 125b
 Anglin Margaret, 125b
 Angling 1334b
 Anglo-Saxon Conquest 1223b
 Anglo-Saxons 126a 1236b
 Angola, Africa 126a
 Angora, 126a
 Angora Goat, 126a, 1527a
 Anhalt, 126a
 Anhydrite 1603b
 Aniline 126a
 Animal 126b, 3339a
 Animal Charcoal, 499a
 Animal Industry, Bureau of, 51a, 3765a
 Animal Intelligence, 127b
 Animal Magnetism 2307b
 Animulae Bell 2791a
 Animals as Companions 1977a
 Anise, 128a
 Anna (coin), 3134b
 Anna Karenina 3592a
 Annam 128b
 Annapolis, Md., 128b
 Annapolis Royal N S 128b
 Ann Arbor Mich 128b
 Annatto 129a
 Anne Queen 129a
 Annealing 129b
 Anne of Cleves 1672a
 Annexation 129b
 Annie Laurie, 129b
 Aniston, Ala., 130a
 Annulus, 130a 428b, 2785a
 Annuity 130b
 Annuxio Gabrielle d', 130b
 Anode, 131a, 1206b
 Anomalistic Month 2404b
 Anopheles Mosquito, 2229a, 2421b
 Anorthite, 1307b
 Ansonia Conn, 131a
 Ant, 131a
 Ant, White 3545a
 Antaeus, 136a
 Antak'ya, 141a
 Antananarivo, 136a
 Antarctic Circle, 136b
 Antarctic Ocean, 136b
 Ant-eater, 136b
 Antelope 137a
 Antennae, 137b
 Anther, 1364a
 Anthology, 137b
 Anthony, Saint, 2382b
 Anthony, Susan Brownell, 138a, 3905b
 Anthracite 362b
 Anthrax, 138a
 Anthropology, 138b
 Antichrist 138b
 Anti-Cigarette League, 138b
 Anticosti Island, 139a, 2983a
 Anticlyclone, 1013a
 Antidote, 139a
 Antietam, Battle of, 140a
 Anti-Federalist Party, 140a, 3052a, 3707b
 Antigone, 140b
 Antilles, 140b, 3850a
 Antilles, Among the Lesser, 3619b
 Anti-Masonic Party, 2890a
 Antimony, 140b
 Antimony Glance 3424a
 Antioch Syria 140b
 Antiochus of Syria, 1890a
 Antipodes, 141a
 Antipope, 141a
 Antipyrene, 141a
 Anti-Saloon League, 141a
 Antiseptic, 141a
 Antitoxin, 141b
 Anti-Trust Laws, 141b
 Anti-Lion 141b
 Antofagasta Chile, 142a
 Antoinette Marie 1659b
 Antony, Mark, 142a, 285a, 246b, 3102b
 Antwerp Belgium, 142b
 Anubis, 142a
 Anvil, 143a
 Aorta, 5b 143a
 Apache 143a
 Ape 143b
 Apelles, 144a
 Appennines, The, 144a
 Aphasia, 144a
 Aphemia, 144a
 Aphides, 144b
 Aphrodite, 144b 3753a
 Aphrodite at the Bath, 2930a
 Apia, Samoa, 144b
 Aplary, 144b
 Apia, 144b
 Apocalypse, 145a, 3053b
 Apocrypha, 145a 403b
 Apollo, 145a, 2452b 2463a
 Apollo Belvedere 145a 3232a
 Apollonius of Perga, 33a
 Apoplexy, 145a
 Apostles 145b
 Apostles' Creed, 384b
 Apostolic Commission 145b
 Apothecaries' Weight, 146a, 2927b
 Apothecary, 146a
 Apotheosis 146a
 Appalachian Mountains 146a
 Appalachicola River, 146b
 Appeal 146b
 Appendicitis 146b
 Apperception, 147a
 Appian Way, 147b, 3096b
 Apple, 148a
 Apple of Discord, 150b
 Apple of Sodom, 3333a
 Appleton, Wis., 150b
 Apple-Tree Borer, 379a
 Appomattox Court House, 150b
 Apricot, 150b
 April, 151a
 Aprse, 151b
 Aspides 151b
 Apteryx, 152a
 Aqua Fortis, 152a, 2578a

- Aquamarine, 152a, 461a
 Aquarium, 152a
 Aquarius, 152b
 Aquatic Plants, 152b
 Aqueduct, 155b
 Aqueous Ammonia, 113b
 Aqueous Humor, 1287b
 Aquilo, 31a
 Aquinas, Saint Thomas, 153b
 Arabat-el-Madfun, 9a
 Arabia, 153b
 Arabian Nights' Entertainment The, 154b, 241b, 1638b, 3955b
 Arabian Sea, 155a
 Arabi Pasha, 155a
 Arabs, 155a
 Arachne, 155b
 Arachne The Story of, 2451b
 Arachnids, 155b
 Arachnoid Membrane, 542a
 Arafat, 155b
 Aragon, 155a 3372b
 Aragon and Castile, 3373b
 Aragus, 156a
 Aral, 156a
 Aramaic, 156a
 Arango Doroteo 3772a
 Arapaho Indians 156a
 Ararat, Mount, 156a 2877a
 Araucanian, 156b, 793b
 Araucaria, 156b
 Arbelia, Turkey, 156b, 1819b
 Arbitration, 156b
 Arbor Day 157a, 2419b
 Arbor Vitae 157a
 Arbutus, 157b
 Areade, 157b
 Arcadia 157b
 Arch, 157b
 Archaeological Ages, 44a
 Archaeology, 158b
 Archaeopteryx, 158b
 Archangel, Russia, 158b
 Archbishop, 159a
 Archaean System, 159a
 Archer-shab, 159b
 Archery, 159b
 Archibald, Adams George, 160a
 Archibald Robert W., 1775b
 Archimedean Screw, 150a
 Archimedes, 160b
 Archipelago, 147b
 Architecture, 160b
 Architecture, Three Orders of, 595b
 Architrave 895b, 1238a
 Arch of Trajan, 3607b
 Arch of Triumph, 166b
 Archon, 157a 271b
 Arc Light, 1209a
 Arctic Circle, 167a
 Arctic Ocean and Lands 167a
 Areturus 167b
 Arden, Mary, 3267b
 Ardmore Okla., 167b
 Areas, Study in 1463b
 Areas of Continents, Comparison, 464b
 Areca, 167b
 Arecibo, P. R., 168a
 Areopagus 168a
 Argentina, Ark, 168a
 Argentina, 168a
 Argol, 3617b
 Argon, 171a
 Argonauts, 171a
 Argus, 171b
 Argyll, George John Douglas Campbell, 171b
 Argyll, John Douglas Sutherland Campbell, 171b
 Ariadne, 171b, 3565a
 Arid Region, 172a
 Ariel, 1456b
 Aries, 172a
 Arion, 172a
 Aristio Ludovico, 172b
 Aristovistus 1497b
 Arista Mariano, 173b
 Aristides 173b

The letter a, after a number, indicates column 1; the letter b, column 2.

- Aristocles, 2871a.
 Aristocracy, 173a, 1542b.
 Aristophanes, 173a.
 Aristotle, 173a.
 Arithmetic, 174a, 2280a.
 Arizona, 210a.
 Arizona, University of, 213b.
 Ark, 214a.
 Arkansas, 214a.
 Arkansas, University of, 218b.
 Arkansas River, 218a.
 Arkwright, Richard, 218b.
 Arlington National Cemetery, 218b.
 Arm, 219a.
 Armada, 219a, 1319b.
 Armadillo, 219b.
 Armageddon, 219b.
 Armature, 219b, 1160a, 2219b.
 Armed Neutrality, 2518b.
 Armenia, 220a.
 Arminius, 221b, 1319b.
 Armistice, 221b, 3802b.
 Armor, 222b.
 Armored Tank, 3511a.
 Armour Family, 221b.
 Armour Institute of Technology, 222a.
 Arms, 222a.
 Armstrong, George B., 2920b.
 Armstrong, Samuel Chapman, 223b.
 Armstrong, William George, 224a.
 Armstrong Gun, 224a.
 Army, 224a.
 Army Wagon, 230a.
 Arica, 230b.
 Arnold, Benedict, 230b.
 Arnold, Edwin, 231a.
 Arnold, Matthew, 231a.
 Arnold, Thomas, 231b.
 Arnold Winkelried, The Story of, 3441b.
 Aromatic Plants, 231b.
 Around the World in Eighty Days, 3761a.
 Arrack, 371a, 3068b.
 Arras, France, 232a.
 Arrest, 232a.
 Arrondissement, 383a, 1061a, 2733b.
 Arrowrock Dam, 1759b, 1843a.
 Arrowroot, 232a.
 Arsenal, 232b.
 Arsenic, 139a, 232b.
 Arsenic Solution, 1806a.
 Arson, 233a.
 Art and the Arts, 233a.
 Artaxerxes, 233a.
 Artemis, 15a, 1070b.
 Arteries, 233b, 2842b, 3218b.
 Arteries, Hardening of the, 3218b.
 Arteries of the Face and Neck, 2509a.
 Artesian Well, 233b.
 Arthropoda, 234a.
 Arthur, Chester Alan, 234a.
 Arthur, Julia, 236b.
 Arthur, King, 236b, 1281b.
 Artichoke, 237a.
 Article (grammar), 237a.
 Articles, The Thirty-nine, 237a.
 Articles of Confederation, 3704b.
 Articulated, 234a.
 Articulation, 237a.
 Artificial Leather, 2073a.
 Artificial Limbs, 237b.
 Artificial Magnets, 2219a.
 Artificial Silk, 3306a.
 Artillery, 238a.
 Arts and Crafts, 239a.
 Arum, 239a.
 Aryan, 239a, 1780a, 2995a.
 Aryan Group of Languages, 2821b.
 Arytenoid Cartilage, 2061a.
 Asafetida, 239b.
 Asbestos, 239b, 2983b.
 Asbjornsen, Peter Christen, 240a.
 Asbury, Francis, 240a.
 Asbury Park, N. J., 240a.
 Ascending Colon, 5b.
 Ascension, Right of, 240a.
 Ascension Day, 240b.
 Asceticism, 240b.
 Ascidians, 3242b.
 Asgard, 240b.
 Ash, 240b.
 Ashanti, 241a.
 Ashburton, Alexander Baring, 241a.
 Ashes, 240b.
 Asheville, N. C., 241a.
 Ashwi Indians, 3988a.
 Ashland, Ky., 241b.
 Ashland, Wis., 241b.
 Ashlar Masonry, 2269a.
 Ashtabula, Ohio, 241b.
 Ash Wednesday, 242a.
 Asia, 242a.
 Asia Minor, 250b.
 Asiatic Cholera, 810b.
 Asp, 23a, 250b.
 Asparagus, 251a.
 Aspasia, 251a.
 Aspen, 251a, 2904a.
 Asphalt, 251a, 463a, 2759b.
 Asphalt Pavement, 2759b.
 Asphodel, 252a.
 Asphyxiation, 252a.
 Aspirates, 253a.
 Aspirator, 252a.
 Asquith, Herbert Henry, 252b.
 Ass, 252b.
 Assam, 253a.
 Assassins, 253a.
 Assault and Battery, 253a.
 Assaying, 253b.
 Assembly, 254a.
 Assignment, 254a.
 Assimilation, 254a.
 Assiniboia, 254a.
 Assiniboine, 254a.
 Assiniboine River, 254a.
 Assistance, Writs of, 3950a.
 Assiut, 3315a.
 Associated Press, 254b.
 Associates (ethics), 1261a.
 Association Football, 254b, 1371b.
 Association of Ideas, 255b.
 Assuan, Egypt, 255b.
 Assuan Dam, 1845b.
 Assumpsit, 255b.
 Assumption, Feast of the, 255b.
 Assumption of the Virgin, 770a.
 Assurbanipal, 257a, 3196a.
 Assyria, 256a.
 Assyrian Sculpture, 2330b.
 Astarte, 257a.
 Aster, 257a.
 Asteroids, 257a, 2865a.
 Asthma, 257b.
 Astigmatism, 258a.
 Astor (family), 258a.
 Astoria, Ore., 258b.
 Astragalus, 259a.
 Astrakhan (fur), 259a.
 Astrakhan, Russia, 259a.
 Astrigent, 259a.
 Astrology, 259a.
 Astronomy, 259b.
 Astro-Photography, 269a.
 Asuncion, Paraguay, 269b.
 Atahualpa, 269b, 1776b.
 Atalanta, 269b.
 Atlanta, The Story of, 2456a.
 Atchafalaya, 269b.
 Atchison, Kan., 269b.
 Athabaska, 270a.
 Athabaska Lake, 270a.
 Athabaska River, 270a.
 Athapascan Indians, 270a.
 Atheism, 270a, 1527b.
 Athelstan, 270b.
 Athenaeum, 270b.
 Athene Nike, Temple of, 2573b.
 Athens, Ga., 272b.
 Athens, Greece, 270b.
 Atherton, Gertrude Franklin, 272b.
 Athletics, 273a.
 Athos, Mount, 275a.
 Atkinson, Edward, 275b.
 Atlanta, Ga., 275b.
 Atlantic Cables, 626b.
 Atlantic City, N. J., 276a.
 Atlantic Ocean, 276b.
 Atlantis, 277a.
 Atlas, 277a.
 Atlas Mountains, 277a.
 Atmosphere, 277b, 1466b, 3339b.
 Atoll, 278a.
 Atom, 278a, 766a.
 Atomic Theory, 278a.
 Atomic Weights, 278a.
 Atonement, 278b.
 Atrium, 279a.
 Atrophy, 279a.
 Atropos, 1302a.
 Attache, 1078a.
 Attachment, 279a.
 Attainder, 279b.
 Attainder, Bill of, 431b.
 Attar, 279b.
 Attention, 279b, 2767a, 2961b.
 Attica, 281a.
 Attila, 281a, 3104b.
 Attorney, Power of, 44a.
 Attribute Complement, 2048a.
 Auber, Daniel Francois Esprit, 281a.
 Auburn, Me., 281b.
 Auburn, N. Y., 281b.
 Auction, 2975b.
 Auckland, New Zealand, 281b.
 Auction, 281b.
 Auction Bridge, 3863a.
 Audiphone, 282a.
 Audubon, John James, 282a.
 Audobon Society, The, 282a.
 Augan Stables, 282b.
 Augas, 282b.
 Augite, 282b.
 Augsburg, Bavaria, 282b.
 Augsburg Confession, 283a.
 Augsburg, Peace of, 3566b.
 Augurs, 283a.
 August, 283a.
 Augusta, Ga., 284a.
 Augusta, Me., 284b.
 Augusta Bridge, 248a.
 Augustan Age, 284b.
 Augustine, Aurelius Augustinus, Saint, 284b, 285a.
 Augustus, 285a.
 Augustus I, Frederick, 285b.
 Augustus II, Frederick, 285b.
 Auk, 285b.
 Auk-Land, Syne, 286a.
 Aurelian, Lucius Domitius Aurelianus, 286b.
 Aurelius, Marcus, 286b.
 Aureola, 1617b.
 Auricle, 1656a.
 Aurora (mythology), 287a.
 Aurora, The, 2705b.
 Aurora, Ill., 287a.
 Aurora Borealis, 287a.
 Aurora Leigh, 673b.
 Ausgleich, 300a.
 Austen, Jane, 287b.
 Austerlitz, Battle of, 287b.
 Austin, Alfred, 287b.
 Austin, Stephen Fuller, 288a.
 Austin, Tex., 288a, 3552b.
 Australasia, 2632a.
 Australia, 288b.
 Australian Alps, 3769a.
 Australian Ballot, 294b.
 Australian Current, 2630b.
 Austria, 295a, 763b.
 Austria-Hungary, 296a.
 Austrian Succession, War of the, 3459a.
 Authors, Hidden Names, 1242b.

Authors, Study of, 3015a.
 Autocrat, 3015b, Breakfast
 Table, 3015b, 1705b
 Autograph, 302a
 Automatic Telephone, 3534a
 Automobile, 302a, 3567a
 Automobile Racing, 2894a
 Autonomy, 305a
 Autoplasty, 3519b
 Autumn, 305b
 Autumnal Equinox, 1035a,
 3242b
 Autumn Fires, 2026a
 Avahis, 2032a
 Avalanche, 305b
 Ave Maria, 305b
 Avernus, 305b
 Aviary, 305a
 Aviation, 305a, 1361b
 Avignon, France, 308a, 2901b
 Avocado Pear 93a
 Avocat 305a
 Avogadro's Law 305b
 Avoirdupois, 305b, 2927a, 3543a
 Ayon, 305b
 Ax, 306b
 Axial Skeleton, 3517a
 Axion, 306b, 1431b
 Axis, 306b
 Axoloti, 307a
 Aye-aye, 307a
 Aymaras, 451a
 Ayr, Scotland, 307a
 Ayrshire Cattle, 723a
 Azules, 307b
 Azerbaïjan, 307b
 Azincourt, 44b
 Aztec Era, 307b
 Azores, 307b
 Azov, Sea of, 308a
 Asteca, 308b, 2221b
 Asurie, 308b

B

B, 309a.
 Basil, 309a, 2242a.
 Babbitt Metal, 309a
 Babbcock, O. B., 3582a.
 Babbcock Test, 2339a.
 Babel Tower of, 309a.
 Bab-el-Mandeb, Strait of, 309b
 Babirusa, 309b
 Baboon, 310a
 Babylon, 310b
 Babylonia, 310b
 Bacchanalia, 311b
 Bacchus, 311b
 Bach, Johann Sebastian, 312a.
 Bacheller, Irving, 312a
 Bachelor's Button, 312a, 302b
 Bachelor's Degree, 312a
 Bacillus, 312b, 314a
 Backgammon, 312b
 Bacon, 313a
 Bacon, Francis, 313a
 Bacon, Nathaniel, 313b
 Bacon Roger, 313b
 Bacon's Rebellion, 312b
 Bacteria and Bacteriology,
 314a
 Baden, 315a
 Baden, Austria, 315b
 Baden-Powell, Robert Steven-
 son Smyth, 315b, 536b
 Badger, 316a
 Badger State, 3596b
 Bad Lands, 316a, 3582a
 Baeda, 372b
 Baedeker Tourist Guides, 316b
 Baer, William, 316b
 Baer's Bay, 316b
 Bagatelle, 316b
 Bagdad, 316b
 Bagpipe, 317a
 Baguio, P. I., 3616b
 Bahama Islands, 317b
 Bahia, Brazil, 317b
 Bahia Blanca, Argentina, 317b
 Bahkal, Lake, 318a

Bailey, Liberty Hyde, 318a.
 Bailiff, 318a
 Bainbridge, William, 318b
 Bakelite, 318a
 Baker, Newton Diehl, 318b
 Baker, Ray Stannard, 318b
 Bakersfield, Calif., 318b
 Baking Powder, 318b
 Baku, Russia, 319a
 Balaca, 319a
 Balaklava, Russia, 319a
 Balance of Power, 319a
 Balance of Trade, 319b
 Balboa, Vasco Nunez de, 320a.
 Bald Buzzard, 321a
 Bald Cypress, 1014a.
 Balder, 320a
 Baldness, 320b
 Bald Pate, 3569b
 Baldwin, Robert, 320b
 Baldwin of Flanders, 997b
 Balearic Isles, 321a
 Balcon, 321a
 Balfe, Michael William, 321a
 Balfour, Arthur James, 321a
 Balfour, John de, 321b, 322a
 Balkan Mountains, 321b
 Balkan Wars, 322a, 596b
 Bal喀什 Lake, 323a.
 Ballad, 323b
 Ball and Socket Joint, 1906b
 Ballarat, Australia, 324a.
 Ballet, 324a
 Balloon, 324b
 Ballot, 325b
 Ball's Bluff, Battle of, 325b
 Baln, 325b
 Balm of Gilead, 325b, 2904a.
 Balsam, 325b
 Baltnagar, 3217b
 Baltic Sea, 325a
 Baltimore, George Calvert,
 326a, 2265a
 Baltimore, Md., 326b
 Baltimore Oriole, 328a.
 Baluchistan, 328a.
 Baluch, Honore de, 328b
 Bamboo, 328b
 Banana, 329a
 Baneroff, George, 330a
 Baneroff, Hubert Howe, 320b
 Band, 320b
 Bandage, 331b
 Bandicero, 598b
 Bandicoot, 331b
 Banff, Alberta, 331b
 Bangalore, India, 332a
 Bangkok Siam, 332a
 Bangor, Me., 332a
 Banga, John Kendrick, 332b
 Bangweolo, Congo District,
 332b
 Banishment, 332b
 Banjo, 332b
 Bank Discount, 1079b
 Bank Draft, 111a
 Bankers' Method, 205b
 Bank Legals, 2386b
 Bank of England, 335b
 Bank of France, 335b
 Bank of the United States,
 335a
 Bankrupt, 333a
 Banks and Banking, 333b
 Bannockburn, 336b
 Banns of Marriage, 336b
 Banthees, 1294a
 Banting, P. G., 337a.
 Bantu, 337a
 Banyan, 337a
 Baptism, 337a
 Baptists, 337b
 Baptist P. Union, 337b
 Baranof Island, 33a
 Barbados Islands, 337b
 Barbados L.E., 131a
 Barbara, Saint, 338a
 Barbara Fritchie, 3589a
 Barbican, 338a
 Barbary, 338a
 Barbecue, 338b

Barbel, 338b
 Barber, 338b
 Barberrry, 338a.
 Barber's Itch, 339a.
 Barblizon Painters, 339b
 Barcelona, Spain, 339b
 Bard, 340a.
 Barbones Parliament, 340a,
 352a
 Barefoot Boy, The, 339a
 Bareilly, India, 340a
 Barge Canal, New York State,
 3501b
 Bar Harbor, Me., 340a.
 Bari, Italy, 340b
 Barium, 340b
 Bark, 340b, 3526b
 Bark Louse, 3508b
 Barker's Mill, 341a.
 Barley, 341a
 Barmeside's Feast, 341b
 Barmen, Germany, 341b
 Barnabaz, 342a
 Barnacle, 342a
 Barnacle Goose, 342b
 Barnard, Frederick Augustus
 Porter, 344a
 Barnard, George Grey, 342b
 Barnard, George, 342a
 Barnard College, 343a
 Barnburners, 343a, 2837b
 Barnum, Phineas Taylor, 343b
 Baroda, British India, 344a.
 Barometer, 344a
 Baron, 345b
 Barr, Amelia Edith Huddles-
 ton, 345b
 Barr, Robert, 345b
 Barrecks Emperors, 3263a,
 3735b
 Barzanquilla, Colombia, 346a
 Barras, Paul Francois Jean
 Nicholas, 346a.
 Barra, Vt., 346a
 Barrel, 346a
 Barrett, John, 3725a
 Barrett, Lawrence, 346b
 Barrie, James Matthew, 346b
 Barrie, Ont., 347a.
 Barrier Reef, 347a.
 Barister, 347a
 Barrow Point, 348a
 Barry (family), 347b
 Barry, Madame du, 3172a
 Barrymore (family), 347b
 Barter and Sale, 348a
 Bartholdi, Frederic Auguste,
 348a
 Bartholomew, 348a
 Bartholomew's Day, Saint,
 348a
 Bartlett, Paul Wayland, 348b
 Bartholomew, Fra., 348b
 Barton, Clara, 349a
 Baryta, 349a
 Basal, 349b
 Bascom, John, 349b
 Basone Bridge, 349b
 Base, 349b
 Baseball, 350a
 Basel, Council of, 352a
 Basel, Switzerland, 352a.
 Basilar Membrane, 1162b
 Basilica, 352b
 Basilisk, 353b
 Basil the Great, 353b
 Baslin, 354a
 Basin of Minas, 244a, 2525a.
 Basket and Basketry, 354a
 Basket Ball, 355a
 Basket Ball (theme), 3559b
 Basque, 355a
 Bass (fish), 355a
 Bass (music), 3511b
 Bass-Terre, B. W. I., 355b,
 3521a
 Bassoon, 355a
 Bass-relief, 355a, 1219b
 Bass Strait, 355a
 Bass Viol, 355a
 Basswood, 355a.

Bastien-Lepage, Jules, 359b.
 Bastille, 359b.
 Basutoland, 359b.
 Bat, 360a.
 Batangas, P. I., 360a.
 Batavia, E. I., 360b.
 Batavia, N. Y., 360b.
 Bath, 360b.
 Bath, Eng., 361b.
 Bath, Me., 362a.
 Bathing, 275a.
 Baths of Caracalla, 699a.
 Baton Rouge, La., 362a.
 Batrachians, 362a.
 Battalion, 226b, 362a.
 Battenberg, House of, 362b.
 Battering-ram, 362b.
 Battery, 362b.
 Battery, How to make a, 1196b.
 Battle, Trial by, 363a.
 Battle above the Clouds, 759b, 1776a.
 Battle Creek, Mich., 363a.
 Battlefields National Park, 2743a.
 Battleford, Sask., 363a.
 Battle Hymn of the Republic, 363b, 1723a.
 Battle of Chickamauga, 781a.
 Battle of the Marne, 2256a.
 Battle of the Nations, 2472b.
 Battle of Verdun, 3755b.
 Battles, Edward, 1819a.
 Battleship, 2497a.
 Batum, Russia, 363b.
 Baucis and Philemon, 364a.
 Bauxite, 364a.
 Bavaria, 364a.
 Bavarian Succession, War of the, 3460a.
 Baxter, Richard, 365a.
 Bay, 365a.
 Baya, 365a, 3838b.
 Bayard, Pierre du Terrail, 365b.
 Bayard, Thomas Francis, 365b.
 Bay City, Mich., 365b.
 Bayeux Tapestry, 366a, 1219b, 3513a.
 Bayonet, 366a.
 Bayonne, N. J., 366a.
 Bayreuth, Bavaria, 366a.
 Bay Rum, 366b.
 Bay Window, 366b.
 Bazine, Francois Achille, 366b.
 Bazar, 366b.
 Beach, Rex, 367a.
 Beagle, 367a.
 Beam, 367a.
 Bean, 367a.
 Beanbag Game, 182a, 1439b.
 Bean Bag Race, 1440b.
 Bear, 367b.
 Bear, Great, 368b.
 Bear and Ell, 369a.
 Bearberry, 369a.
 Beard, 369a.
 Beard, Daniel Carter, 369b, 536b, 3261a.
 Bearded Vulture, 2009b.
 Bear State, The, 214a.
 Beast, Bird or Fish (game), 1441b.
 Beatrice, Neb., 369b.
 Beatrice Portinari, 370a.
 Beatty, David, 370a, 3924a.
 Beaumarchais, Pierre Augustin Caron de, 370a.
 Beaumont, Francis, 370b.
 Beaumont, Tex., 370b.
 Beauregard, Pierre Gustave Toutant, 370b.
 Beaver, 371a.
 Beaver State, 2672b.
 Bebel, Ferdinand August, 371b.
 Bechuana, 371b.
 Becket, Thomas A., 371b.
 Becky Sharp, 372a.
 Bed, 372a.

Bed (geology), 372b.
 Bedbug, 372b.
 Bedbug Poison, 139a.
 Bede, The Venerable, 372b.
 Bedford, Ind., 372b.
 Bedlam, 373a.
 Bedloe's Island, 373a.
 Bedouins, 373a.
 Bee, 373b.
 Beech, 376a.
 Beecher, Henry Ward, 376a.
 Beecher, Lyman, 376b.
 Beef, 377a, 1099b.
 Beef, Extract of, 377a.
 Beef Cattle, 725b.
 Beelzebub, 377b.
 Beer, 377b.
 Beersheba, 377b.
 Beeswax, 378a, 3834b.
 Beet, 378a.
 Beethoven, Ludwig von, 378b.
 Beetle, 378b.
 Beet Sugar, 3463a.
 Begin, Louis Nazaire, 379b.
 Begonia, 379b.
 Behring, Emil Adolf, 380a.
 Beirut, Asiatic Turkey, 380a.
 Bel, 380a.
 Belasco, David, 380a.
 Belem, Brazil, 2730a.
 Belfast, Ireland, 380b.
 Belgian Congo, 312a.
 Belgian Hare, 2992b.
 Belgium, 380b, 3917a.
 Belgrade, Serbia, 384a.
 Belial, 384a.
 Belisarius, 384a.
 Belize, British Honduras, 384b, 566b.
 Belknap, William W., 1775b.
 Bell, 384b.
 Bell, Alexander Graham, 385a, 1823a.
 Bell, John, 385b.
 Bell, Robert, 385b.
 Belladonna, 385b.
 Belladonna Lily, 386a.
 Bellaire, O., 386a.
 Bellamy, Edward, 386a.
 Bellbird, 386a.
 Bell-crane, 386b.
 Belleau Wood, 2253a.
 Belles-Lettres, 386b.
 Belle Isle, Strait of, 386b.
 Bellerophon, 386b.
 Belleville, Ill., 387a.
 Belleville, Ont., 387a.
 Belligerent, 387a.
 Bellingham, Wash., 387a.
 Bellini, Giovanni, 387b.
 Bellini, Vincenzo, 387b.
 Bellona, 387b.
 Bellows, 387b.
 Bell Metah, 570a.
 Bellows Fish, 388a.
 Bell-Smith, Frederick Mariett, 388a.
 Belmont (family), 388a.
 Beloit, Wis., 388b.
 Belshazzar, 388b, 422a.
 Belt, 388b.
 Belt, The Great, 389a.
 Beluga, 389a, 3453a.
 Benares, India, 389a.
 Benedict, Saint, 2382b.
 Benedict XV, 389b.
 Benedictine, 390a.
 Benedictines, 390a.
 Benefit of Clergy, 390a.
 Bengal, 390a.
 Bengal, Bay of, 391a.
 Bengali, 391a.
 Bengough, John Wilson, 391a.
 Benguela, Portuguese West Africa, 391a.
 Benguela Current, 2630a.
 Ben-Hur, 391b, 3789a.
 Benjamin, 391b.
 Benjamin, Judah Philip, 391b.
 Ben Lomond, 391b.

Bennett, [Enoch] Arnold, 392a.
 Bennett, James Gordon, 392a.
 Bennett, Richard B., 392b.
 Ben Nevis, 392b.
 Bennington, Vt., 392b.
 Bennington, Battle of, 393a.
 Bennington Battle Monument, 3759a.
 Bentinck, Count G., 3878a.
 Banting, Frederick G., 337a.
 Benton, Thomas H., 393a, 2566a.
 Benton Harbor, Mich., 393b.
 Benzene, 392b.
 Benzine, 392b.
 Benzozate of Soda, 28b, 393b.
 Benzol, 393b.
 Beowulf, 394a, 2120b.
 Berber, 394a.
 Beresford, Lord Charles, 394a.
 Bergamot, 394a.
 Bergen, Norway, 394b.
 Bergh, Henry, 396b.
 Bergson, Henri Louis, 394b.
 Bering, Vitus, 395a.
 Bering Island, 395a.
 Bering Sea, 395a.
 Bering Sea Controversy, 395a.
 Bering Strait, 395b.
 Berkeley, Calif., 395b.
 Berkeley, William, 395b, 3799b.
 Berkshire Hills, 396a.
 Berlin, Congress of, 396a.
 Berlin, Germany, 396b.
 Berlin, N. H., 396a.
 Berlin, Treaty of 3652b.
 Berlin, University of, 398a.
 Berliner, Emil, 366a.
 Berlioz, Hector, 398a.
 Bermuda Cedar, 733a.
 Bermuda Grass, 398b.
 Bermuda Islands, 398a.
 Bern, Switzerland, 398b.
 Bernard, Saint, 399a.
 Bernhardt, Rosine, 399a.
 Bernini, Giovanni Lorenzo, 399b, 3234a.
 Bernstorff, Count Johann Heinrich von, 399b, 3927a.
 Bersaglieri, 400a.
 Bertillon System, 400a.
 Bertrand, Count, 705b.
 Beryl, 400a.
 Besant, Annie, 400b, 3562a.
 Besant, Walter, 400b.
 Bessarabia, 400b.
 Bessemer, Ala., 401a.
 Bessemer, Henry, 401a.
 Bessemer Converter, 3418a.
 Bessemer Steel, 3418a.
 Bet, 3793b.
 Betel, 401a.
 Bethany, 402a.
 Bethel, 402a.
 Bethesda, 402a.
 Bethlehem, 402a.
 Bethlehem, Pa., 402a.
 Bethmann-Holweg, Theobald Theodore von, 402b.
 Beveridge, Albert Jeremiah, 402b.
 Bayrout, Asiatic Turkey, 380a.
 Bhutan, India, 402b.
 Bible, 403a.
 Bible Schools, 3472a.
 Bible Stories, 405b.
 Bibliography, 427a.
 Bibliomania, 427a.
 Bibliotheque Nationale, 427a, 2738a.
 Bileps, 427a.
 Bichloride of Mercury, 965b.
 Bicol, 2818a.
 Bicycle, 427b.
 Blideford, Me., 428a.
 Biela's Comet, 988a.
 Biennials, 428a, 522a, 2788a.
 Bienville, Jean Baptiste le Moyne, 428b.
 Bierstadt, Albert, 428b.
 Bigamy, 428b.
 Big Bend State, 3538b.

Big Dipper 365b
Bigelow, Poulney, 429a
Bighorn, 429a, 3274b
Bighorn River, 429b
Biglow Papers, 429b
Bignonia 429b
Big Sandy River, 429b
Big Trees, 365a
Bibao Spain, 430a
Bile, 430a
Bile Duct, 1433b
Bill, 430a
Bill (legislative), 316b
Billiard Balls, 431a
Billards, 430b
Billings, Mont., 431b
Billingsgate 431b
Bill of Attainder 431b
Bill of Costs, 432a
Bill of Exchange, 432a
Bill of Health, 432a
Bill of Lading, 432a
Bill of Rights 432b
Bill of Sale, 432b
Biloxi, Miss., 432b
Biometallism, 433a
Binder Twine 433a
Bindweed 433a
Bingen, Germany, 433a
Bingen on the Rhine, 434a
Binghamton N. Y., 434a
Binocular, 434a
Binomial, 434a
Binomial Theorem, 434a
Biogenesis, 434a
Biography, 434b
Biological Survey, Bureau of, 434a
Biology, 449a, 3990a
Biplane, The, 1352b
Birch, 449a
Bird, 449b 3487a
Bird Books 458a
Bird Day, 458b
Bird Laws, 458b
Bird Migration, 2334a
Bird Reservations 458a
Birds' Christmas Carol, The, 2138a
Birds-eye Maple, 2489a
Birds of Paradise 458b
Birds of Prey 458a
Birkenhead, Eng., 459a
Birmingham, Ala., 459a
Birmingham, Eng. 459a
Birnam Wood, 460a
Birney, James Gillespie, 460b, 1884a
Births Deaths and Marriages, Registration of, 460b, 3043b
Birthstones 461a
Bisbee, Arizona, 461a
Biscay, Bay of, 461a
Bishop, 461a
Bismarck, N. D., 461b
Bismarck Archipelago, 461b
Bismarck-Schonhausen, Karl Otto Eduard Leopold, 462a
Bismuth 462b
Bismuth, 590b
Bithynia, Asia Minor, 462b
Bitter Ash, 3980a
Bittern, 463a
Bitternut, 463a
Bitterroot 463a
Bitter Spar, 1092b
Bitterweed, 3998a
Bitumen 463a
Bituminous Coal, 583a
Bituminous Shale, 463b
Bivalves, 3380b
Bluet, Alexandre Cesar Leopold, 463b
Bjornson Bjornstjerne, 463b
Black, 464a
Black, William 464a
Black Art, 3502b
Black Beetle, 3526a
Blackberry, 464a
Blackbird, 464b
Blackburn, Eng., 464b

Black-Capped Chickadee, 3586b
Black Crabs, 2011b
Black Death, 464b, 2564a
Black-eyed Susan, 464b
Blackfish 464a
Blackfoot Indians, 465a
Black Forest, 465a
Black Friars, 1105a
Black Friday, 1541a
Black Grouper, 1894a
Black Gum 466a
Black Hawk, 466a
Black Hills, 465b, 3365a
Black Hole of Calcutta, 466b
Blacking, 466a
Black Lead 2771b
Blacklist, 466a
Black Locust, 1714a
Blackmail, 466a
Black Man (game), 1440a
Black Monday 3385b
Blackmore, Richard Doddridge, 466a
Black Mountains, 466b
Black Sea, 466b
Blacksnake, 466b
Blackstone, William 467a
Blackwell, Elizabeth, 467a
Blackwell's Island, 467a
Bladderwort, 467b
Blaine, James Gillespie, 467b
Blair (family) 468a
Blake, Edward, 468b
Blake, Robert, 468b
Blanc-mange, 468b
Blanco, 4722b
Bland, Richard Parks, 469a
Bland-Allison Bill, 3712b
Blank Verse 469a
Blarney Stone, 469a
Blashfield, Edwin Howland, 469b
Blas-furnace, 469b, 3416b
Blasting, 469b
Blavatsky Helena Petrovna, 470a, 3562a
Blanching, 470a
Blank House, 1072b
Bleeding Heart, 470b
Blende, 470b
Blenheim, 470b, 1819b
Blennerhassett Harman, 471a
Bleebok, 471a
Blessed Damosel, The, 3120b
Best Be the Tie That Binds, 1750b
Blight, 471a
Blindfish, 471a
Blindness, 471a
Blind Spot, 1287b
Blindworm 472b
Bliss, Philip Paul, 472b
Bliss Tasker Howard, 472b
Blister, 473a
Blister Pearls, 2765a
Blissard, 473a
Blockade 473a
Block and Tackle, 473b
Blockhouse 474a
Bloemfontein, Orange Free State, 474a
Blondel, 474a
Blood, 474b, 2842b
Blood Avenger of, 475a
Blood Circulation of the, 2842a
Blood Transfusion of, 3808a
Bloodhound 475a
Blood-money 475a
Bloodroot, 476a
Bloodstone, 481a, 1665a
Bloody Assizes, 476b
Bloomer Costume, 476b
Bloomfield-Zeissler Fanny, 476b
Bloomington, Ill., 476b
Bloomington, Ind., 476b
Blooming and Fruit, 3627b
Blount, William, 1775a

Blowfly, 476a
Blowing Machine, 476a
Blowpipe, 476b
Blubber, 476b 3240a
Blucher, Gebhard Leberacht von, 476b
Blue, 477a
Blue Beach, 1720a
Bluebeard 477a
Bluebell 654b, 477a
Bluebird, 477a
Blue Books, 477b
Bluebuck, 1372a
Bluefield, W. Va., 477b
Bluefields, Nicaragua, 477b
Bluedash, 478a
Blue Grass, 478a
Blue Grass State, 1936b
Blue Gum, 1266b
Blue Hen State 1050b
Blue Heron, 1879a
Blue Laws, 478a
Blue Mountains 478b
Blue Monday, 2335b
Blue Print 478b
Blue Racer, 466b
Blue Ridge, 478b
Blue Sky Laws 479a
Blue Vulture, 479a, 3467b
Blunderbuss, 479a
Blushing, 479b
Boa, 479b
Boabdil 479b
Boar, 480a
Board of Aldermen, 77b 829b
Board of Trade, 480a
Boat, 481b
Boatbill, 481a
Boatswain, 481a, 3637b
Bobolink, 481a
Bobwhite, 2978a
Boccaccio, Giovanni, 485b
Bochum, Germany 485a
Bochum, England, 485a
Boehmeria 485b
Boeotia 486b
Boers, 486b, 3349b, 3610a
Boe, 486b
Bog Asphodel 252a
Bog Bean, 585a
Bog Oak, 486b
Bogota Colombia, 487a
Bohemia, 487a
Bohemian Girl, The, 321a
Bohlen Gustav von, 1995a
Boles, Horace, 487b
Boil 488a
Boiler, 488a
Boiling (cooking), 1100a
Boiling Point, 488b 2837a 3562b
Bois de Boulogne, 489a
Boise, Ida., 489a
Bok Edwin W., 489b
Bokhara, 489b
Bokhara Ruga, 3130a
Boleyn, Anne, 489a, 725b, 1671b
Bollingbroke, Henry Saint John, 490b
Bolivar, Simon, 490b, 492b, 2750b
Bolivia 491a
Boll Weevil, 492b 3842b
Bologna, Italy, 492a
Bolshevik and Bolshevism, 492b 1326b, 3137b, 3138b, 3145b, 3292a, 3377b, 3493a 3632a, 3926a
Bolton, 492a
Bomb, 494a
Bombardier Bastie, 494b
Bombardment, 494b
Bombay (city), 495b
Bombay (Presidency), 494b
Bombazine, 496a
Bona Fide 496a
Bonanza, 496a
Bonaparte (family), 496a
Bonaparte, Charles, 2476b
Bonaparte, Joseph, 3472a

- Bond, 497b
 Bonded Warehouses, 1011b
 Bone, 498b
 Boneblack, 498a
 Boneset, 499a
 Bonheur, Marie Rosa, 498a
 Bon Homme Richard, 499a, 5057a
 Boniface (Popes), 499b
 Boniface, Saint, 499b
 Bonito, 499b
 Bonn, Germany, 500a
 Bonnet-rouge, 500a, 5095b
 Bonspiel, 1009b
 Bonus, 500a
 Bony Fish, 2398a
 Booby, 500a
 Book, 500b
 Bookbinding, 501b
 Bookkeeping, 502b
 Book of Mormon, 3413a
 Bookplate, 503b
 Books for Young People and Adults, 3012b
 Bookworm, 504a
 Boomerang, 504a
 Boomer State, 504a
 Boone, Daniel, 504a, 1941a
 Boone, Iowa, 504b
 Booth (family), 504a, 3179b
 Booth, John Wilkes, 2113b
 Booth-Tucker, Frederick, 505b
 Boots and Shoes, 506a
 Borage, 507a
 Borax, 507a
 Bordeaux, France, 507b
 Bordeaux Mixture, 1309b
 Borden, Robert Laird, 507b
 Bore, 508a
 Boreas, 508a
 Borghese (family), 508a
 Borghese Palace, 508a
 Borgia (family), 508b
 Borglum, Gutzon, 508b, 2428a
 Boric Acid, 509a
 Boring Machines, 509a
 Borneo, 509b
 Borne, 510a
 Bosnia, 510a
 Bosporus, 510b
 Boston, Mass., 510b
 Boston Massacre, 515a
 Boston Tea Party, 515a
 Boston University, 515a
 Boswell, James, 515a
 Bosworth Field, Battle of, 515b
 Botanic Garden, 515b
 Botany, 515a
 Botany Bay, 528a
 Botry, 529a
 Bothnia, Gulf of, 529a
 Bothwell, James Hepburn, Earl of, 529a
 Botticelli, Sandro, 529b, 2704a
 Bottle, 529b
 Bottle-tree, 530a
 Boucicault, Dion, 530a
 Boughen, George Henry, 530a
 Boulanger, Georges, 530a
 Boulder, 530b
 Boulder, Col., 530b
 Boulder Dam, 530b
 Boulogne, France, 530b
 Bounty, 531a
 Bouquetin, 1753b
 Bourbon, 531a
 Bourbon Ile de, 3053b
 Bourgeoisie, 532a
 Bourget, Paul, 532a
 Bourinot, John George, 532a
 Bow, 532b
 Bowdoin, James, 532b
 Bowdoin College, 532b
 Bowler, Mackenzie, 532a
 Bowler-bird, 533a
 Bowers, Tom, 533b
 Bowie, James, 53a
 Bowling, 532b
 Bowling Green, Ky., 534a
 Box-elder, 534b
 Boxer Rebellion, 534b
 Boxing, 534b
 Boxing the Compass, 535a
 Box Kite, 1987a
 Box Tortoise, 535a
 Box Tree, 535b
 Boycotting, 535b
 Boy Kite, 1987b
 Boyle's Law, 535b
 Boyne, Battle of the, 535b
 Boys and Girls Clubs, 536a
 Boy Scouts, 536b, 3261a
 Boy Scouts' Signal Code, 3301a
 Boy's Song, A., 2034b
 Bosman, Mont., 507a
 Boschar, Marco, 507a
 Brabant, 507b
 Braddock, Edward, 537b
 Braddock, Pa., 538a
 Bradford, Eng., 538a
 Bradford, Pa., 538a
 Bradford, William, 538b
 Bradley, Joseph Philip, 538b
 Bradstreet, Anne, 538b
 Brady, Cyrus Townsend, 539a
 Brags, Braxton, 539a
 Brabe, Tycho, 539b
 Brahma, 539b
 Brahmanism, 539b
 Brahmaputra, 540b
 Brahms, Johannes, 541a
 Braille System, 472a
 Brain, 541a
 Brain, Development of the, 2983a
 Brake, (mechanics), 542a
 Brake, (plant), 542b
 Bramante, Donato, 542b
 Bramble, 542b
 Bran, 542b, 1952b
 Brandeis, Lewis Demblitz, 542b
 Brandenburg, Prussia, 542a
 Brandes, Georg Morris Cohen, 542a
 Brandon, Man, 543b
 Brandy, 543b
 Brandywine, Battle of the, 543b
 Brangwyn, Frank, 543b
 Brant, Joseph, 544a, 2857b
 Brant Goose, 551a
 Brantford, Ont., 544a
 Brass, 544a
 Brass Serpent, 544b
 Brazil, Ind., 544b
 Brazil, The United States of, 545a
 Brazilian Current, 2640a
 Brazil Nut, 547b
 Brasilwood, 547b
 Brasos River, 547b
 Breach of Promise, 548a
 Breach of the Peace, 2761a
 Bread, 548a, 5491b
 Breadfruit, 548b
 Breakspear, Nicholas, 28a
 Breakwater, 549a
 Breathing, 549b
 Breathing Exercises, 2835a
 Breckenridge, John Cabell, 550a
 Breches Bible, 404b
 Breeding, 550a
 Bremen, Germany, 550b
 Bremerhaven, Germany, 551a
 Brent Goats, 551a
 Brescia, Italy, 551a
 Bremen, Germany, 551a
 Brest-Litovsk, Russia, 551b
 Brest, France, 551b
 Bretagne, or Brittany, 552a
 Breton, Jules Adolph, 552a
 Brevel, 552a
 Breviary, 552a
 Brewster, David Josiah, 552a
 Brewing, 552b
 Brewster, David, 553a, 1259a
 Brewster, William, 553a
 Briand, Aristide, 553a
 Bribery, 553b
 Brick and Bricklaying, 553b
 Brick Pavement, 2765b
 Bridge, 555a
 Bridge (game), 3862b
 Bridge of Sighs, 557b, 2751b
 Bridgeport, Conn., 557b
 Bridges, Robert, 558a
 Bridge Whist, 3862b
 Bridgman, Laura Dewey, 558a
 Brigade, 227a, 558b
 Brigandage, 558b
 Bright, John, 558b
 Brighton, Eng., 559a
 Bright's Disease, 559a
 Brimstone, 559a, 2467a
 Briquettes, 1422a
 Brisbane, Arthur, 559b
 Brisbane, Australia, 559b
 Bristles, 559b
 Bristol, Conn., 559b
 Bristol, Eng., 559a
 Bristol, R. I., 559a
 Bristol, Tenn., 559a
 Bristol, Va., 559a
 Bristol Board, 702b
 Bristol Channel, 560b
 Bristolow, Benjamin H., 3882a
 British Almanac, 100b
 British America, 560b
 British Association for the Advancement of Science, 560b
 British Cabinet, 624a
 British Colonies, 833b
 British Columbia, 561a
 British East Africa, 565a
 British Empire, 565a
 British Guiana, 565a
 British Honduras, 565b
 British Isles, 567a
 British Museum, 567a
 British North America Act, 567b, 2556b
 British Somaliland, 3244b
 British West Indies, 567b
 Britannia Secunda, 2796a
 Brittany, 568a
 Broad Church, 1235b
 Broadway, 2556a
 Brocade, 568a
 Brock, Isaac, 568b
 Brockton, Mass., 568b
 Brockville, Ont., 568b
 Brodeur, Louis Philippe, 569a
 Broiling (cooking), 1699b
 Broken Wind, 1659b
 Broker, 569a
 Bromides, 569b
 Bromine, 569b
 Bronchial Tubes, 569b
 Bronchitis, 569b
 Bronte, Charlotte, 570a
 Bronze, 570a
 Bronze Age, 570b
 Brook Farm, 570b
 Brookline, Mass., 570b
 Brooklyn, N. Y., 571a
 Brooklyn Bridge, 570a, 3090b
 Brooks, Phillips, 571a
 Brooks, Preston Smith, 571b
 Broom Corn, 571b
 Broom Grass, 571b
 Brother Jonathan, 571b, 3640a
 Brough, Frances, 2265a
 Broussa, 571b
 Brown, 572a
 Brown, Charles Brockden, 572a
 Brown, Elmer Ellsworth, 572a
 Brown, George, 572a
 Brown, Jacob, 2805b
 Brown, John (American), 572b
 Brown, John (Scottishman), 572b
 Brown, John George, 572a
 Brown, Charles Farrar, 572a
 Brownies, The, 573a, 579b
 Browning, Elizabeth Barrett, 573b

The letter a, after a number, indicates column 1; the letter b, column 2

Browning, Robert, 574a.
 Browning Gun, 2202a, 2074a.
 Brownstone, 594b
 Brownsville, Tex., 574b
 Brown-tail Moth, 575a, 2655b
 Brown Thrasher, 575a, 2575a.
 Brown Thrush, The, 2027a
 Brown University, 576a
 Bruce, Robert, 575b, 3224a
 Bruges, Belgium, 575b
 Brummell, George Bryan, 576a.
 Brunelleschi Filippo, 576a.
 Brunnhilde, 2202a.
 Brunn, Austria, 576a.
 Brunswick (family), 576b
 Brunswick (former duchy), 576b
 Brunswick, Ga., 577a.
 Brunswick, Germany, 577a.
 Brunswick Black, 577b
 Brusa, 577b
 Bruch, 577b
 Bruch, Charles Francis, 577b
 Brussels, Belgium, 578a.
 Brussels Rug, 3130b
 Brussels Sprouts, 578b
 Brutus, Decimus Junius, 578b
 Brutus, Marcus Junius 578b
 Bryan, William Jennings, 579a, 5713a.
 Bryant, William Cullen, 580a, 5022a.
 Bryce, George, 580b
 Bryce, James, 581a
 Bryn Mawr College, 581a.
 Bryophytes, 515b, 515a, 581a, 2141a.
 Bubastis, 581b
 Bubonic Plague, 284a
 Buconeoers, 581b, 2411b
 Bucentaur, 581b
 Bucephalus, 581b
 Buchanan, James, 582a
 Buchanan, Robert William, 583b
 Bucharest, Peace of, 3652b
 Bucharest, Rumania, 585a.
 Buck, Dudley, 585a.
 Buck Bean, 585a
 Buckboard, 585b
 Bucket Shop, 585b
 Buckeye, 585b, 2637a.
 Buckingham, George Villiers, 585b
 Buckle, Henry Thomas, 585a.
 Buckler, 2230a.
 Buckner, Simon Bolivar, 586a.
 Buckskin, 586a, 1045a.
 Buckthorn, 586b
 Bucoice, 3765a.
 Buckwheat, 585b
 Bud, 587a
 Budapest (Hungary), 587a.
 Buddha, 588a
 Buddhism, 588a.
 Budding, 1544a.
 Budget, 589a.
 Budget, The (Canada), 2747a.
 Buds and Branches, 3626a.
 Buell, Don Carlos, 589a
 Buena Vista, Battle of, 589b
 Buenos Aires, Argentina, 589b
 Buffalo, 590a.
 Buffalo, N. Y., 591a.
 Buffalo Bill, 572b
 Buffalo Grass, 592a.
 Buffalo Park, 2742a.
 Bug, 592a
 Buggy, 592b
 Bugle, 592b
 Building, 593a.
 Building Laws, 594a.
 Building-stone, 594b, 2675b
 Bukharest, Rumania, 585a
 Bukovina, 594b
 Bulb, 595a.
 Bulgaria, 595b, 3764a.
 Bull, 597b
 Bull, Ole Bornemann, 597b
 Bullard, Robert Lee, 597b

Bulldog, 598a.
 Buller, Redvers, 3250a.
 Bullet, 598a
 Bullfighting, 598a.
 Bullfinch, 598b
 Bullfrog, 598b
 Bullion, 598a.
 Bullion State, 2366a.
 Bullock, William, 2545b
 Bull Run, Battles of, 599a.
 Bulls and Bears, 369a
 Bull's-eye, 599b, 3515a.
 Bulow, Bernhard Heinrich, 599b
 Bulow, Hans Guido von, 599b
 Bulrush, 600a.
 Bulwer Lytton, Edward George, 600a.
 Bulwer, George Headley Vick-ers, 600a.
 Bumblebee, 600a.
 Bundesrat, 600b
 Bundes-Verammlung, 3483a.
 Bungalow, 151a, 600b
 Bunion, 601a
 Bunker, 2295a.
 Bunker Hill, Battle of, 601a
 Bunsen, Robert Wilhelm Eber-ard, 601b
 Bunsen's Battery, 601b
 Bunsen's Burner, 601b
 Bunt, 601b
 Bunting, 601b
 Bunyan, 602a
 Buoy, 602a.
 Burbank, Luther, 464a, 602b
 Burbank Potato, 2223b
 Burbot, 604b
 Burdette, Robert Jones, 604b
 Burdock, 604a
 Bureau, 604a
 Bureau of American Ethnog-raphy, 1265a.
 Bureau of American Repub-lics, 2722a
 Bureau of Animal Industry, 3765a.
 Bureau of Corporations, 1305a
 Burgess, House of, 1871a
 Burglary, 605a
 Burgomaster, 605b
 Burgoyne, John, 605b
 Bur Grass, 3184a
 Burgundy, 605b
 Burgundy Wines, 605b
 Burlal, 605b
 Burke, Edmund, 606a
 Burlap, 606b
 Burlesque, 606b, 1115a
 Burlingame, Anson, 606b
 Burlington, Ia., 607a
 Burlington, N. J., 607a
 Burlington Vt., 607a
 Burma, 607b
 Burne-Jones, Edward, 608a
 Burnett, Frances Eliza Hodg-son, 608a
 Burnham, Daniel Hudson 608b
 Burnham, Sherburne Wesley, 608b
 Burning, 896b
 Burning Glass, 609a, 2054b
 Burnley Bag, 609a
 Burns, John, 609a
 Burns, Robert, 609b
 Burns and Scalds, 610b
 Burnside, Ambrose Everett, 610b
 Burnt Offering, 3153a.
 Burr, Aaron, 611a.
 Burroughs, John, 611b
 Burying Beetle, 611b
 Bury the Hatchet, 3592b
 Bushbuck, 127a
 Bushel, 612a
 Bushman, 612a.
 Bushnell, David, 1623a.
 Business College, 612a.
 Bust, 612b
 Bustard, 612b

Butcher Bird, 3290b
 Butler, Benjamin F., 612b
 Butler, Ellis Parker, 612a
 Butler, Nicholas Murray, 612a.
 Butler, Pa., 612b
 Butler, Pierce, 613a
 Butler College, 613b
 Butte, 613b
 Butte, Mont., 613b
 Butter, 614a
 Buttercup, 614b
 Buttercup Family, 524a.
 Butter Factory, 585a
 Buttery, 614a
 Buttery Kite, 1987b
 Butterine, 2653b
 Butternut, 614a
 Butterweed, 1345b
 Butterwort, 615a
 Buttermilk, 615a
 Butternorth, Hezekiah, 615a
 Buttone, 545b
 Buzzard, 619a.
 Buzzard's Bay, 619a
 By-law, 619a.
 Byng Julian, Lord, 619a.
 Byrd, Richard S., 519a
 Byrom, John, 3267b
 Byron, George, (Lord) 619b
 Byzantine Art, 620b
 Byzantine Empire, 621a
 Byzantine Architecture, 164b
 Byzantium, 622b, 925b

C

C, 623a.
 Caaba, 1922a.
 Cabal, 623a.
 Cabbage, 623a
 Cabbage Palm, 623b
 Cabbage Rose, 623b
 Cabinet (British), 1560a
 Cabinet Coalition, 865b
 Cabinet Making, 625b
 Cabinet of the President, 624a.
 Cabin John Bridge, 185a
 Cable, George Washington, 625b
 Cable, Submarine, 626a
 Cabot (family), 627b
 Cabot, Sebastian, 3779b
 Cabral, Pedro Alvarez, 628a
 Cabul, Afghanistan, 1922a
 Cadorna, General, 3923a
 Caecum, 1822a
 Cacao, 628a
 Cactus, 628b
 Caddice Fly, 629b
 Caddoon Indians, 629b
 Cadillac, Mich., 629b
 Cadiz, Spain, 629b
 Cadmium, 630a
 Cadmus, 630a, 2450b
 Caduceus, 630a.
 Cadmon, 630b
 Caesar, 630b
 Caesar, Caius Julius, 630b, 448b
 Caesium, 632a
 Caffeine, 632a, 973a
 Caffeotannic Acid, 3512a
 Cagliari, 632b
 Caiaphas, 632b
 Cain, 632b
 Caine, Thomas Henry Hall, 632b
 Cairn, 632a.
 Cairo, Egypt, 633a.
 Cairo, Ill., 633b
 Calceon (artillery), 634a
 Calceon (engineering), 633b, 1055a
 Calabar Bean, 634a.
 Calabash, 634b
 Calais, France, 634b
 Calamint, 634b
 Calamus, 635a.
 Calceolaria, 635a.
 Calcimine, 635a.

- Calcination 635a.
 Calcite, 635b
 Calcium, 635b
 Calcium Carbide, 635b
 Calculating Machines, 635b
 Calculus (mathematics), 636a.
 Calculus (medicine), 636b
 Calcutta, British India, 636b
 Caledonia, 637a, 3219b
 Caledonian Canal, 637a.
 Calendar, 637a.
 Calenda, 1923b
 Calgary, Alberta, 638a
 Calhoun, John Caldwell, 638b
 Calico, 639b
 Calico Bush 1923b
 California, 640a.
 California, Gulf of, 645a
 California, University of, 645a
 California Current, 2630b
 Caligula, Gaius Caesar Augustus Germanicus, 645b
 Calipers 645b
 Caliph, 645b
 Calipha 2414b
 Calisthenes 646a
 Calixtus (Popes), 646a
 Calligraphy, 646a
 Calla, 646a
 Callao, Peru, 646a
 Calling Hare, 2852a.
 Calliope, 646b
 Calliope (mythology) 2438b
 Calms, Regions of, 646b
 Calmucks, 1924a
 Calomet, 646b
 Calorie, 646b, 1267a, 3564a
 Calorimeter, 647a
 Calory, 646b
 Calumet, 647a.
 Calumet and Hecla Mine, 2346b
 Calvary 647a
 Calve, Emma, 647a
 Calvin and Calvinism, 647a.
 Calycanthus, 648a.
 Calypso 648a
 Calyx, 648a, 648a, 1264a.
 Cam, 648a
 Camaguey, Cuba, 648a
 Cambodia, Indo-China, 648b
 Cambodia River 2292b
 Cambon Jules Martin, 648b
 Cambrai, France, 648b
 Cambrian Period, 649a
 Cambrian System, 649a.
 Cambridge, 649a
 Cambridge, Mass 649a
 Cambridge, O. 649b
 Cambridge Unit of 649b
 Cambyse 649b, 1190b
 Camden Battles of, 650a
 Camden N. J. 650a
 Camel 650b
 Camel Bird 2688a
 Camellia 651a
 Camelpard 7513b
 Camero, 651a 2931a.
 Cimeter, 651b
 Cimeter Lucida 652b
 Cimeter Obacura, 652b
 Cameron, Simon, 652b
 Cimeroon, 1924a.
 Cimille, 653a, 1153a.
 Cimmerio Luteo, 653a.
 Camomile, 748a.
 Cimorri, 653a
 Camouflage 238a 653b
 Camp, Walter, 653b
 Campagna di Roma, 654a
 Campanile, 384b, 654a.
 Campanini Cleofonte, 654a.
 Campanula, 654b
 Campbell, Alexander, 654b
 Campbell, Alexander (Canadian) 654b
 Campbell, Collin, 655a
 Campbell Thomas, 655a
 Campbell-Bannerman, Henry, 655b
 Campeachy, 655b
 Camp-Fire Girls, 656b
 Camphor, 656b
 Campo-Formio, Treaty of, 1863b
 Campo Santo, 657a
 Camps and Camping, 657a
 Campus Martius, 658a.
 Canaan, 411a
 Canaanites, 660a
 Canada, Dominion of 660b
 Canada, Supreme Court of, 3475b
 Canada and the World War, 665b
 Canada Balsam, 676a.
 Canada East, 2984b
 Canada Goose, 676a.
 Canada Thistle 676b
 Canada West, 2658a
 Canadian Agricultural Colleges, 51b
 Canadian Banks, 386b
 Canadian Cabinet, 624b
 Canadian Civil Service, 386b
 Canadian Department of Agriculture, 51b
 Canadian Experiment Farms and Stations, 62a
 Canadian Hemp, 1091a
 Canadian Northern Railway, 3002b
 Canadian Northwest, 3134b
 Canadian Pacific Railroad, 3002b
 Canadian River, 676b
 Canadian Rockies, 3088b, 3089a
 Canadian Rugby, 1371a
 Canadian Weather Bureau, 382a
 Canadian Universities, 3720b
 Canal, 676b
 Canals of Canada, 678a.
 Canal Zone 2722b
 Canary, 679b
 Canary Current, 2630a.
 Canary Islands, 680a
 Canary Seed, 680a.
 Cancellation, 680b
 Cancer (astronomy), 681a, 2638a
 Cancer (medical), 680b
 Candahar Afghanistan, 1924b
 Candle, 681b
 Candleberry, 681b
 Candlefish, 681b
 Candlemas, 681b, 3908a.
 Candy, 681b
 Candyfuf, 682b
 Cane, 682b
 Canella, 683a.
 Cane Sugar, 3462b
 Canine Tooth, 3527a.
 Canis Major, 683a
 Canker, 683a
 Cankerworm, 683a
 Canne, Italy, 683a.
 Cannel Coal, 683a.
 Cannibal, 683b
 Canning, 683b
 Canning, George, 1562b
 Canning Clubs, 684a.
 Cannon, 685b
 Cannon, Joseph Gurney, 686b
 Canoe, 687a
 Canon Law, 687b
 Canonization, 687b
 Canova, Antonio, 687b, 3234b
 Cantabrian Mountains, 688a
 Cantaloupe, 2444a
 Cantata, 688a
 Canterbury, Eng, 688a
 Canterbury Tales, 688b, 760b, 2121a
 Canticles, 2243a
 Cantilever Bridge, 656a
 Canton (district), 1061a.
 Canton, China 688b
 Canton, Ill., 689a.
 Canton, O., 689a.
 Cantonment, 689a.
 Canute, 689b
 Canvas, 689b
 Canvaeback, 690a, 1150a.
 Canyon, 690a, 3079b
 Canyons of the Yellowstone, 3963a
 Caoncheou, 3128a
 Cape, 690a.
 Capacity, Measures of, 2300a.
 Cape Ann, 690a
 Cape Barrow, 690a
 Cape Blanco, 690a.
 Cape Braton, 690b
 Cape Charles, 690b
 Cape Clear, 690b
 Cape Cod, 690b
 Cape Cod Canal, 691a
 Cape Comorin, 691a
 Cape Fear, 691a
 Cape Flattery, 691b
 Cape Girardeau, Mo., 691b
 Cape Hatteras, 691b
 Cape Henlopen, 691b
 Cape Henry, 691b
 Cape Horn, 691b
 Cape Jasmine, 1878b
 Cape Lookout, 691b
 Cape May, N. J., 692a
 Cape of Good Hope, 692a
 Cape of Good Hope, Province of the, 692a
 Caper, 693a.
 Capercallie, 693b
 Capernaum, 693b
 Cape Sable, 693b
 Cape Saint Vincent, 693b
 Capetian Dynasty, 693b
 Cape-to-Cairo Railway, 693b
 Cape Town, So Africa, 694b
 Cape Verde, 695a
 Cape Verde Islands, 695a.
 Cape Wrath, 695a
 Capias, 695a.
 Capillaries, 695b
 Capillarity, 695b
 Capital (architecture), 696b
 Capital (economics), 696a
 Capital Letters, 696b
 Capital Punishment, 696b
 Capital Punishment Should be Abolished (theme), 3550b
 Capitals of the United States, 697a
 Capital Stock, 3424b
 Capitol, 697a
 Cap of Liberty, 500a.
 Cappadocia, 697b
 Capricorn, Tropic of, 2638a.
 Capricornus, 697b
 Caprification, 1320b
 Capri, George Leo, 697b
 Capsicum 697b
 Capsule, 697b
 Capua, Italy, 698a
 Capuchins, 698a
 Capybara, 698b
 Carabao, 698b
 Caracal, 699a
 Caracalla, 699b
 Caracalla, Baths of, 3096b
 Caracca, 699a
 Caramel, 699a
 Carat, 699a.
 Caravaggio, Michelangelo
 Amerigo Merisi da, 699b
 Caravan, 699b, 3156b
 Caravel, 699b
 Caraway, 700a.
 Carbohydrate, 700a, 10961a, 1267a
 Carbolic Acid, 139a, 700a.
 Carbon, 700a
 Carbonate Ore 1837b
 Carbonates, 700b
 Carbondale, Pa., 700b
 Carbon Dioxide, 701a
 Carbon Disulphide, 700b, 3467b
 Carbonic Acid, 767a

The letter a, after a number, indicates column 1; the letter b, column 2.

- Carbonic Acid Gas 139a 701a.
Carbon Oxide, 139b 701a
Carboniferous Period 701b
Carboniferous System, 701b
Carbon Monoxide, 701a.
Carborundum 701b
Carbuncle 100b, 702a.
Carburetor, 702a.
Cardemum, 702a.
Cardboard, 702b
Cardenas 703a.
Cardiff, Wales 703a.
Cardinal, 703a.
Cardinal Bird, 703a
Cardinal Flower, 703b
Cardinals, College of, 3152b
Cards, Playing, 703b
Careot, 1546b
Carex, Henry 703b
Carey Act, 1542a
Caribbean Sea, 703b
Caribou, 704a
Caribs, 3521b
Caribbean Sea, 704a 714b
Carlson, Guy, 704a.
Carlston, Will 704b
Carlisle Pa 704b
Carlos I 704b
Carlsbad, Bohemia, 705a
Carlsruhe, Germany, 705a
Carle, Thomas, 705a.
Carman, Albert, 705a.
Carman, (William) Bliss, 705a
Carmel 706b
Carmelite= 705b
Carmen, 463b 555b, 706b, 2306b
Carmine, 706b
Carnation, 707a
Carnegie, Andrew, 707a
Carnegie Foundation for the Advancement of Teaching, 707b
Carnegie Hero Fund 707b
Carnegie Institution 707b
Carnegie Libraries 708a
Carnegie Penco Fund, 708a.
Carnelian, 708a
Carnivorous Animals 708b
Carnivorous Plants, 708b
Carnot, Marie Francois Sadi, 708b
Carolina Jasmine, 1879a.
Carolingians, 709a.
Carotid Arteries, 709a.
Carp, 709a
Carpathian Mountains 709b
Carpenter, Frank George, 709b
Carpenter-bee, 709b
Carpel, 709b
Carpentermakers 710a, 3711b
Carpel Beetle, 710a
Carpel Sweeper, 710b
Carpus 3318b
Carracei, 710b
Carrageen, 1836b
Carranza, Venustiano, 710b, 3222b, 3854b
Carrera Marble 710b 2249a.
Carril, Alexis, 711a, 2577b
Carrilage 711a
Carrier Pigeon, 711b
Carroll, Charles, 711b
Carrot, 712a
Carson, Christopher, 712a
Carson, Edward Henry, 712a.
Carson City, Nev 712b
Carisena, Colombia, 712b
Carisena Spain 712b
Carte Blanche, 713a
Cartier, George, 713a
Carthage, 713a
Carthage, Mo 713b
Carthusians, 714a
Cartier, Georges Etienne, 714a.
Cartier, Jacques, 714a.
Cartilage Gristle, 714b
Cartilaginous Tissue, 821b
Cartoon, 714b
Cartouche, 714b
Cartridge 715a
Cartwright, Edmund, 715a.
Caruso, Enrico, 715a.
Carver, John, 715b
Carving, 715b
Cary, Alice and Phoebe, 715b
Caryatides 716a 1249b
Casaba Melon, 716a
Casabianco, 716a
Casa Grande Ruin, 2742a
Cascade, 723a.
Cascade Range, 716a
Cascade Tunnel, 716b
Cascara, 716b
Casco Bay, 716b
Casein, 716b
Cushmore, 1933b
Cashmere Goat, 717a.
Cash Register, 717a
Casimir-Perier, Jean Paul
Pierre 717a
Casplan St 717b
Cass Lewis 717b
Cassandra 717b
Cassava, 718a
Cassell, Germany, 718a
Cassia, 718a
Cassini, 718a
Cassiopeia, 718b
Cassiterite, 718b, 3523b
Cassowary, 719a.
Cast, 719a
Castanets, 719a.
Castel, 719b
Castile, 719b
Castillo Soap, 5334a
Castilloa Tree, 3127a
Castle, 719b
Castle, Edgerton and Agnes, 720a
Castle Garden 720b
Castor and Pollux 720b
Castor Oil, 720b
Cat, 721a.
Catecombs, 721b
Catalpa 722a
Catalina Island, 722a
Catalpa 722b
Catamount 722b 3870b
Cat and Mouse (game) 1440a
Catania, 722b
Catapult, 722b
Catastrac, 723a
Catastrophe, 723b, 722b
Catarrh, 723a
Catawba Indians 723b
Catawba River, 723b
Catbird, 723b
Catechism 723b
Catechu 724a
Caterpillar, 724a, 2491a
Caterpillar Tractor 3505b
Catesby, Robert, 1596b
Catfish, 724b
Catgut, 724b
Catherine I 725a.
Catherine II, 725a 3095a 3142b
Catherine de' Medici, 725a
Catherine of Aragon, 725b
Catherine Wheel, 3113a.
Cathay, 726b
Cathedral, 726b
Cather, Willa Sibert, 726a.
Cathode, 1206b
Cathode Rays 726a
Catholic Church, 726b
Catholic University of America, 726b
Cathline, 726b
Catkin, 727a
Catnip 727a
Cato, Marcus Porcius, 727a.
Cato the Elder, 727b
Cato's eye 727b, 817b
Catakill Mountains 728a.
Cat's Tail, 3583a
Cat-Sitich (game), 1439b
Catwup, 1942b
Catt, Carrie Chapman, 728a.
Cat-tail, 728a.
Cattagat, 728b
Cattle 728b, 3222a.
Cattle Plague, 3076a
Caucasian Rug, 3130a
Caucus, 728b
Caucasus, 729b
Caulliflower, 729b
Caustic, 729b
Caustic Potash, 139b
Caustic Soda, 3337b
Cavallieri, Lina, 729b
Cavaliers, 730a
Cavalleria Rusticana, 730a
Cavalry, 226a, 730a.
Cave, 730b
Caveat, 731a.
Cave Dwellers, 731a
Cavilar, 731a.
Cavite, P. I., 731a.
Cavour Count Camillo Benso di, 731b
Cawnpore India, 731b
Caxton William, 732a, 2942a.
Cayenne, French Guiana, 732a.
Caymans 98a
Cayuga Indians 732a.
Cayuga Lake, 732a.
Cebu, 732b
Cecil, William, 732b
Cecilia, Saint, 732b
Cecropia, 732b
Cecrops, 271b, 733a.
Cedar, 733a
Cedar Creek, Battle of 733a
Cedar Mountain, Battle of 733b
Cedar Rapids Ia., 733b
Celano, 2573b
Celebes Island, 733b
Celery, 734a
Celestial Equator 1248b
Celestial Globe, 1523a
Celestino (Popes) 734a.
Celibacy 734b, 3093b
Cell, 734b
Cellini Benvenuto, 735a.
Cello 3775a
Cellophane 735a.
Celluloid, 735a
Cellulose 735a
Celts, 735b
Cements, 735b, 2776b
Cemetery, 736a
Cenci, Beatrice, 736b
Cenis, Mont, 736b
Cenozoic Era, 737a.
Censer, 737a
Censors, 737a.
Censorship 737a.
Census, 737b
Cent, 737b
Centaur, 738a.
Centaurus, 738a
Centennial Exposition, 738a
Centennial Seal, The 855a
Center of Gravity, 738b, 1556a
Centigrade, 3553b
Centimeter, 738b
Centipede, 739a.
Central America 739a.
Central Park N. Y. 2556b
Centrifugal Force, 739a, 1372b
Centrifugal Pump, 2970a
Centripetal Force, 739b, 1372b
Century of Progress Exposition, 739b
Cephalopoda, 740a
Cephalothorax, 3518b
Cerberus 740a, 3875a
Cereals, 3584a
Cerebellum, 541b 740a
Cerebro-Spinal System, 2508a
Cerebrum, 541b 740b
Ceres, 741a, 3454b, 2950a.
Cereus, 741a
Cerium 741b
Corro Gordo Battle of, 741b
Corticaria, 2949b

The letter a, after a number, indicates column 1; the letter b, column 2.

- Cervantes Saavedra, Miguel de, 741b
 Cervara, 741b
 Cervin, Mont, 2281b
 Cetacea, 742a
 Cession, 129b
 Cettinje, 742b
 Cevennes, 742b
 Ceylon, 742b
 C G S Unit, 2381b
 Chacma, 310a
 Chrd Lake, 743a
 Chadwick, George Whitfield, 743b
 Chaffinch, 743b
 Chagres River, 743b
 Chain, 743b
 Chain (surveying), 744a
 Chain-mall, 223b
 Chain Pump, 2910a
 Chalcedony, 744a
 Chaldea, 744a
 Chaldean-Assyrian Architecture, 163b
 Chaldee Language, 744a
 Chaleurs Bay, 744b
 Chalice, 744b
 Chalk, 744b
 Chalk System, 986a
 Challenger Expedition, 746a
 Chalons Battle of, 746a, 1319b
 Chamberlain (family), 746a
 Chamber of Commerce, 746b
 Chamber of Commerce of the U S, 746b
 Chambers, Robert W, 747a
 Chambersburg, Pa., 747a
 Chambly-Lake Champlain Canal, 679a
 Chameleón, 747a, 2490a
 Champlain, Cecile Louise Stephanie, 747b
 Chamola, 747b
 Chamomile, 748a
 Champagne, 748a
 Champaign Ill., 748a
 Champ de Mars, 748a
 Champlain, Lake, 748b
 Champlain, Samuel de, 748b
 Champ, Elysées, 748b, 2737a
 Chancel, 748a
 Chancellor, 749a
 Chancellorsville, Battle of, 749a
 Chang-Chow, China, 749b
 Change of Venue, 3753a
 Channel Islands, 749b
 Channing, William Ellery, 749b
 Chantecler, 3120b
 Chanute, Kans., 750a
 Chaparral, 750a
 Chaparral Cock, 3081a
 Chaplain, 750a
 Chapleau, Joseph Adolphe, 750a
 Chapman, George, 750a
 Chapelkeeper, Battle of, 750b
 Charade, 750b
 Charades, Acting, 1239b, 1442a
 Charcoal, 750b, 767b
 Chard, 751a
 Charge d' Affaires, 751a
 Charge of the Light Brigade, 751a
 Chart, 751a
 Charity, Bureau of, 2759a
 Charity, Sisters of, 751b
 Charity and Charities, 761b
 Charlemagne, 752a, 1853a
 Charles I (Austria-Hungary), 753a
 Charles I (England), 753b, 3056b
 Charles II (England), 753b
 Charles VI (France), 754a
 Charles VII (France), 754a
 Charles IX (France), 754a
 Charles X (France), 754b
 Charles V (Holy Roman Emperor), 754b
 Charles VI (Holy Roman Emperor), 755a
 Charles XII (Sweden), 755a
 Charles XIV John (Sweden), 755b
 Charles Martel, 755b, 1394b
 Charles the Bald, 759a
 Charles the Bold, 759a
 Charles the Fat, 1394b
 Charles the Great, 752a
 Charleston, S C, 756a
 Charleston, W Va, 756b
 Charlotte, N C, 756b
 Charlotte Adelgonde (Princess), 2191b
 Charlotte Amalie, V I, 3776a
 Charlottenburg, Prussia, 757a
 Charlottetown, P E I, 757a
 Charon, 757b
 Chart, 757b
 Charter, 757b, 329b
 Charter Oak, 757b
 Chartism, 758a
 Chase, Salmon Portland, 758a
 Chase, Samuel, 1775a
 Chat, 758a, 3503b
 Chatham, N B, 758b
 Chatham, Ont., 758b
 Chattahoochee River, 759a
 Chattanooga, Battles of, 759a
 Chattanooga, Tenn., 759b
 Chattel, 760a
 Chattel Mortgage, 2412b
 Chatterton, Thomas, 760a
 Chaucen, Geoffrey, 760a
 Chaudiere River, 760b
 Chauveur, 760b
 Chautauqua Assembly, 3773b
 Chautauqua Institution, 760b
 Check, 761b
 Checkers, 762a
 Cheese, 762b
 Cheese Insects, 765a
 Cheetham, 762a
 Chemistry, 762a
 Chemistry, Bureau of, 51a
 Chemnitz, Germany, 769a
 Chenille, 769a
 Cheops, 768a, 2927b
 Cherbourg, France, 769a
 Cherokee Indians, 769b
 Cherry, 769b
 Cherry Laurel, 770a
 Cherry Valley Massacre, 770a
 Cherub, 770a
 Chesapeake, The, 770a, 3806a
 Chesapeake and Ohio Canal, 770b
 Chesapeake Bay, 770b
 Chess, 770b
 Chest, 772a
 Chester, Eng., 772b
 Chester, George Randolph, 772b
 Chester, Pa., 773a
 Chesterfield, Philip Dormer Stanhope, 773a
 Chesterton, Gilbert Keith, 773a
 Chestnut, 773b
 Chevalier Bayard, 365b
 Cheviot Hills, 773b, 3220b
 Chevron, 773b
 Cheving Gum, 773b
 Cheyenne, Wyo., 774a
 Cheyenne Indians, 774a
 Chicago, Ill., 774b
 Chicago University of, 780b
 Chickadee, 3586b
 Chickahominy River, 781a
 Chickamauga, Battle of, 781a
 Chickamauga National Park, 781a
 Chickasaw Indians, 781b
 Chickasha, Okla., 781b
 Chicken Hawk, 1699b
 Chicken of the Sea, 3646a
 Chicken-Pox, 781b, 784a
 Chicla, 782a
 Chicopee, Mass., 782a
 Chicory, 782a
 Chicoutimi, Que., 782a
 Chiffon, 782b
 Chigger, 1896b
 Chigago, 1896b
 Chihuahua, Mex., 782b
 Chilibian, 782b
 Child and Parent, 2734b
 Child Harold's Pilgrimage, 819b
 Child Labor, 782b
 Children, Reading for, 3014a
 Children, Societies for, 783b
 Children's Bureau, 783b
 Children's Crusade, 899a
 Children's Diseases, 783b
 Children's Hour, The, 2032b
 Children's Thinking, 3570b
 Childs, George William, 786a
 Child Study, 786a, 2961a
 Child Training, 787a
 Child Training Chart, 791a
 Child, 793b
 Child Con Carne, 795b
 Chillicothe, O., 795b
 Chillon, 795b
 Chills and Fever, 2223a
 Chimborazo, Mount, 795b
 Chimera, 795b
 Chimney, 795b
 Chimney, 795a
 Chimpanzee, 796a
 China, 796b
 China Painting, 805b
 Chinatown, 3188a
 Chinaware, 2908a, 2925b
 Chinoh Bug, 806a
 Chinchilla, 806b
 Chinese Immigration, 806b
 Chinese-Japanese War, 807a
 Chinese Ruins, 810a
 Chinese Turkestan, 3648b
 Chinese Woolflower, 3810b
 Chinook (wind), 807b
 Chinook Indians, 807b
 Chios, 30a
 Chipmunk, 807b, 3398a
 Chippendale, Thomas, 1427b
 Chippewa Falls, Wis., 807b
 Chippy, 808a
 Chiropractic, 2716b
 Chiron, 31b, 808a
 Chiropractic Healing, 808a
 Chiroptera, 808a
 Chitons, 808b, 1143b
 Chivalry, 808b
 Chlamys, 1143b
 Chloral, 189b, 809a
 Chlorate, 809a
 Chloride of Sodium, 3176b
 Chlorine, 808a
 Chlorite Schist, 809b
 Chloroform, 809b
 Chlorophyll, 809b, 1265a, 2074a
 Choate, Joseph Hodges, 809b
 Chocolate, 810a
 Choctaw Indians, 810a
 Choice, 810a
 Choice of Good Reading, 3015b
 Choke Damp, 810b
 Cholera, 810b
 Cholera Infantum, 810b
 Cholera Morbus, 810b
 Chopin, Frederic Francois, 811a
 Chord, 811a
 Chorea, 1170b
 Choroid, 1287a
 Chorus, 811b
 Chosen, 811b
 Chowchow, 2847a
 Christ, 813b
 Christchurch, N Zealand, 813b
 Christian IV, 856b
 Christian II, 113b
 Christian X, 813b
 Christian Catholic Church, 1110a

The letter a, after a number, indicates column 1; the letter b, column 2.

Christian Endeavor, The
United Society of, 314a
Christian Era, 314a
Christiania, Norway, 314a
Christianity, 314b
Christians, 1079a
Christian Science, 314b
Christiansted, Virgin Islands,
3870b
Christmas, 315b
Christ of the Andes, 121a, 170b
Christy, Howard Chandler,
315b
Chromatic, 316b
Chromatic Aberration, 7a
Chromatic Scale, 3208b
Chromic Iron Ore, 315b
Chromite, 315b
Chromium, 315b
Chromosphere, 3470b
Chronicles, Books of, 316b
Chronology, 317a
Chronometer, 317a
Chrysalia, 318a, 317a
Chrysanthemum, 317b
Chrysobery, 317b
Chrysolite, 317b
Chrysoprase, 317b
Club, 318a
Chuquissaca Bolivia, 3460a.
Church, 318a
Church, Frederick Edwin
318a
Churchill, Winston, 318a
Churchill, Winston Leonard
Spencer, 318b
Churchill River, 318a
Church of Jesus Christ of Lat-
ter Day Saints, 341a
Church of the Holy Sepulcher,
1888a.
Church of the Latter Day
Saints, 3337b
Churn, 319a
Churning, 314a
Churubusco, Battle of, 319a.
Chyme, 319a, 1076a
Chyme, 319b, 1075b
Cicada, 319b
Cicely, 320a
Cicero, Marcus Tullius, 320a
Cid, The, 320a, 320b, 3271b
Cider, 321a
Cienfuegos, Cuba, 321a
Cigar, 321a, 3258b
Cigarette, 321a
Cilia, 322a
Cimbric, 322a
Cimmerian Bosphorus, 310b
Cinchona, 322a, 3290a
Cincinnati, Ohio, 322b
Cincinnati, Society of the, 324a
Cincinnati, University of, 324a.
Cincinatus, Lucius Quintus,
324b
Cincinnati of the West, 324b
Cinderella, 324b, 2791a
Cineraria, 325a
Cinna, Lucius Cornelius, 325a
Cinnabar, 325a
Cinnamon, 325a
Cintra, Convention of, 3246b
Cissalia, 325b
Circ, 325b
Circle, 209b, 325b, 3299a
Circuit Court of Appeals, 375a
Circulation of the Blood, 326a,
3242a
Circumference, 326b
Circus, 326b
Circus Maximus, 3096b
Cirrhus, 328a, 2215b
Cisalpine Gaul, 1465a.
Cisalpine Republic, 328a
Cistercians, 328a
Cisterns, 328b
Cities, Growth of, 2905a, 3290b
Cities of Canada, Largest, 329b
Cities of Refuge, 328b

Cities of the United States,
Largest, 329a
Cities of the World, Largest,
329b
Citizen, 328b
Citric Acid, 328a.
Citron, 328a.
Citrus, 328a.
City, 329a.
City Council, 77b
City Manager, 329b
City of Brotherly Love, 2810b
City of David, 1595b
City of Magnificent Distances,
3212a.
City Planning, 321a
Ciudad Juarez, Mex., 322a
Civet, 322a
Civil Death, 322a
Civil Engineer, 1325b
Civil Government, 322b
Civilization, 324a
Civil Law, 325a
Civil List, 325b
Civil Service, 326b
Civil Service in Canada, 325b
Civil War in America, 327a,
3710b
Claborn's Rebellion, 341b
Clairvoyance, 341b
Clam, 341b
Clan, 342a.
Clarendon, Edward Hyde, 342b
Claret, 342b
Clarinet, 342b
Clark, Champ, 343a
Clark, Francis Edward, 343a
Clark, George Rogers, 343b
Clark, William, 343b
Clarkeburg, W. Va., 343b
Clark University, 344a
Classification, 344a.
Claudius, 344a
Cleave, 344b
Claxton, Philander Priestley,
344a.
Clay, 344b, 2244b
Clay, Henry, 344b
Clayton-Bulwer Treaty, 345b
Cleanliness, 1101b
Clearing House, 345b
Cleave, 345a
Cleveland, Moses, 2642a.
Cleburne, Tex., 346b
Cleft Grafting, 1544b
Clematis, 346b
Clemenceau, Georges Benja-
min Eugene, 346b
Clemens, Samuel Langhorne,
347b
Clement (Pope), 348a
Cleopatra, 348b
Cleopatra's Needles, 348a,
2565b
Clement, The, 1424a, 2222b
Cleveland (Stephen) Grover,
348b
Cleveland, Ohio, 353a
Click Beetle, 354b, 3596a
Click Dwellers, 355a
Climate, 355b
Clinton, De Witt, 356a.
Clinton, George, 356b
Clinton, Henry, 356b
Clinton, Ia., 357a
Clisthenes, 371b, 357a.
Clive, Robert, 357a.
Cloaca Maxima, 358a, 357b
Clock, 357b
Closed Shop, 358b
Clodur, 370a
Cloth, 358b
Clothes Moth, 359a
Cloth, 359a, 1302a.
Cloud, 359a
Cloud-burst, 360b
Clover, 360b
Clove, 360b
Clovie, 361a, 1394b

Club, 361a.
Cunny Lace, 361b
Clyde River, 361b
Clymene, 3452b
Clytemnestra, 362a.
Coal, 362a, 363b
Coal, 362a, 379a, 2776b, 3677b
Coal Gas, 139b
Coalition Cabinet, 365b
Coal Tar, 365b
Coastal Plain, 366a, 2884b
Coast and Geodetic Survey,
United States, 366a
Coast Artillery, 366b
Coast Defense, 328b
Coast Guard, 366b
Coasting, 367a
Coast Range, 367b
Coast (metal), 367b
Coast, Ont., 368a.
Cobb, Irwin Shrewsbury, 368a
Cobden, Richard, 368a
Cobsequid Mountains, 2614a
Coblenz, Germany, 368b
Coblenz Cove, 361a
Cobourg, Ont., 368b
Cobra, 368b
Cobwebs, 368a.
Cocaine, 129b, 369a.
Coccus, 369a
Cochin-China, 369a.
Cochineal, 369b
Cochlea, 1163b
Cockatoo, 369b
Cockburn Island, 2241b.
Cockchafer, 370a
Cocklight, 370a
Cockle, 370a
Cocklebur, 370a
Cock of the Wood, 693b
Cockroach, 370a.
Cocoon, 325a, 359a.
Cocoon, 370b
Cocoon, 724b
Cod, 371a.
Code Napoleon, 371b, 2471a.
Code of Signals, International,
3300a
Code Writing, 371b
Codfish, 371b
Codling Moth, 372a
Cod-liver Oil, 372a.
Cody, William Frederick, 372b
Codification, 372b
Codistars, 372b
Coeur d'Alene, Ida., 373a.
Coffee, 373a
Cofferdam, 374b
Coffeeville, Kans., 374b
Coffin, 375a
Cognomen, 3487a.
Cohan, George Michael, 375a
Cohesive, 3532a
Cohesion, 375a, 3527b
Cohoes, N. Y., 375b.
Cohorts, 329b
Coining, 375b
Coins, Foreign, 376a.
Coin, 377a
Coin, Dr. Stanton, 3236a
Coke, 377a, 2775b
Coke, Edward, 377a.
Colchicum, 377b
Cold Harbor, Battles of, 377b
Cold Storage, 377b
Cold Wave, 378a
Coleridge, Samuel Taylor, 378a
Coleridge-Taylor, Samuel,
378b
Colfax, Schuyler, 379a.
Colic, 379a.
Coligny, Gaspard de, 379a
Colloidal, 379b
College, 379b, 3720a.
College of Cardinals, 3152b
Collegiate Institute, 379b
Collie, 379b, 1093b
Collingwood, Ont., 380a
Collins, William, 380a

- Collins, [William] Wilkie, 880
 Colloidion, 880a
 Colocrya, 880b
 Colerage, 880b
 Colombia, Republic of, 881a
 Colombo Ceylon, 882a
 Colon, 882a
 Colon (physiology), 882b
 Colonel, 882b
 Colonel Carter of Cartersville, 882b
 Colonial Period, 882a
 Colonies and Colonization, 882b, 3701a
 Color, 884b
 Colorado, 885a
 Colorado, University of, 888b
 Colorado Beetle, 8923b
 Colorado River, 889a
 Colorados 3723b
 Colorado Springs, Col., 889a
 Color Blindness, 889b
 Colored Pencils, 8772a
 Color Lithography, 3414b
 Color Photography, 8827b
 Color Printing, 2941b
 Colosseum, 889b
 Colossus, 889a
 Colossus of Rhodes, 890a
 Colt, Samuel, 3057b
 Colt's Tail, 1345b
 Columbia, Mo., 896b
 Columbia, Pa., 890b
 Columbia, S. C., 890b
 Columbia River, 891a
 Columbia River Highway 891a
 Columbia University, 891b
 Columbine, 892a
 Columbus, Christopher, 892a
 Columbus, Ga., 894b
 Columbus, Ind., 894b
 Columbus, Miss., 894b
 Columbus, Ohio, 894b
 Columbus Day, 2633b
 Column, 895a
 Columns, Hall of, 3260b
 Comanche Indians, 896b
 Combustion 896b, 2685b
 Comedy, 897a, 1115a
 Comenius, John Amos, 897a
 Comets, 897a
 Comic Opera, 898a
 Comitia, 898a
 Commander, 898b
 Commencement, 898b
 Commentaries on American Law, 1936a
 Commerce, 898b
 Commerce, Chamber of, 746b
 Commerce, Department of, 899a
 Commerce in the United States, 3585a
 Commercial Agency, 899a
 Commercial Geography, 1462a
 Commercial Law, 899b
 Commissioned Officers 228a
 Commissioner of Education, 1183a
 Commission Form of Government 899b
 Committees of Congress, 915b
 Committees of Correspondence, 899b
 Committees of Parliament (Canada), 2746b
 Committees of Public Safety, 1416b
 Commodore, 900a
 Commodus, 3104a
 Common Carrier, 900a
 Common Council, 829b, 900b
 Common Law, 900b, 2056b
 Common Schools, 900b
 Commonwealth of England, 902a, 3052b
 Commune, 902a, 1061a
 Commune of Paris, 302a
 Communism, 902b, 3335a
 Community Center, 902b
 Commutator, 1160a
 Como, Italy, 903a
 Como, Lake, 903a
 Comoro Islands, 903b
 Company, 226b
 Comparative Philology, 2820a
 Compass, 903b
 Compasses, 904a
 Compass Plant, 904a
 Compleat Angler, The, 3801a
 Complement (grammar), 2048a
 Complementary Air, 549b
 Complementary Colors, 885a
 Composite Family, 904b
 Composite Order, 895b
 Composition (art), 1118a
 Composition of Forces, 905a
 Compositions, 2036b
 Composition Work, 2032b, 2045a, 2047a, 2051a, 2056a
 Compound Engine, 3414b
 Compounds, Chemical, 764b
 Compressed Air, 905a
 Compromise of 1850, 905a
 Compulsory Education, 905b
 Comte, Auguste, 906a, 1165a, 3335b
 Concentrate, 2308a, 3309a
 Conception, Chile, 906b
 Concept, 906b
 Concertina, 907a
 Conch, 907a
 Concha, 1163a
 Conclave, 907b
 Concord, Mass., 907b
 Concord, N. H., 907b
 Concordance, 907b
 Concordat, 908a
 Concrete, 908a
 Concrete Bridge, 557b
 Condensation 908b
 Condensed Milk, 2339a
 Condoir, 908b
 Conduction, 1657a
 Conductors, 1201a
 Conduit System, 1206a
 Cone, 909a
 Conemaugh Lake, 2779a
 Coney Island, 909a
 Confederacy, United Daughters of the, 909b
 Confederacy of Delos, 272a
 Confederate States of America, 809b
 Confederate Veterans, United, 811a
 Confederate Veterans, United Sons of, 911a
 Confederation, Articles of, 911b, 3704b
 Confederation of the Rhine, 911b
 Confessions of an English Opium Eater, 1061b
 Confucius, 912a
 Conglomerate, 911b
 Congo, 912b
 Congo Free State, 1413a
 Congo River, 912a
 Congregationalists, The, 913a
 Congregation of the Index, 3772a
 Congress, 913b
 Congressional Record, 914a
 Congressman-at-large, 914a
 Congress of Mothers, National, 914a
 Congress of the United States, 914b
 Congress of Vienna, 3771b
 Congreve, William, 915b
 Coniferæ, 916b
 Conjunction (astronomy), 917a
 Conjunction (grammar), 917a
 Conjunctions, 917a
 Conkling, Roscoe, 917b
 Connaught, Duke of, 917b
 Conneaut, Ohio, 918a
 Connecticut, 918a
 Connecticut River, 921b
 Connective Tissues, 921b
 Connellsville, Pa., 922a
 Conrad, Joseph, 922a
 Conscientiousness, 9245a
 Conscriptio, 923a
 Conservation, 923a
 Conservative, 923b
 Conservatory, 615b, 923b
 Console, 923b
 Consolidated Schools, 3214a
 Consonant, 923b, 2683a
 Consort, 924a
 Conspiracy, 924a
 Constable, 924a
 Constance, Council of, 3299b
 Constance, Lake, 924a
 Constant, Arch of, 924b
 Constantine, Caus Flavius, 924b
 Constantine I, 924b
 Constantinople, Turkey, 925a
 Constellations 926a
 Constitution, 926b
 Constitution, 926b
 Constitution, Adoption of the, 3706a
 Constitution, The, 927a
 Constitutional Law, 1067a
 Constitutional Union Party, 927b, 2888a, 2890b
 Constitution of the United States, 109b, 927b
 Consul, 926b
 Consumption (economics), 936a
 Contagious Diseases, 936a
 Contempt, 936a
 Contiguity, The Law of, 2295b
 Continental Islands, 1347b
 Continental Shelf, 2692b
 Continental System, 936a
 Continents, 35b, 442a, 1269a, 2682a, 3350b
 Contraband of War, 936b
 Contract, 937a
 Contract Labor Law, 937b
 Contradiction, Law of, 2670b
 Contrato, 3311b
 Convection, 1657a
 Converter, 8418a
 Convict Labor, 838a
 Convulsus, 938a
 Convulsion, 938b
 Conway, Thomas, 328a
 Conway, Cabal, 838b
 Cony, 2582a
 Cook, Frederick A., 2604b
 Cook, James, 938a, 1648a, 3266b
 Cookery, 939a
 Cook's Expedition 2604b
 Coolidge, Calvin, 938a, 1226Cb, 2933
 Coon, 2092a
 Cooper, James Fenimore, 889b
 Cooper, Peter, 940a
 Cooperation, 940b
 Cooperation, 941a
 Cooper Union, 941b
 Coosa River, 941b
 Coot, 941b
 Copal, 941b
 Copenhagen, Denmark 942a
 Copernicus, Nicholas, 942b
 Copley, John Singleton, 942b
 Copper, 942b, 3678b
 Copperas, 942b, 3467b
 Copper Carbonate Solution, 1806b
 Copper Glance, 943b
 Copperhead, 943b
 Coppermine River, 944a
 Copper River, 944a
 Copper Sulphate, 3467b
 Copra, 944a
 Copra, 944a
 Copy-hold, 3772b

- Copying Devices, 944a.
 Copyright, 945a
 Coquelin (family), 946a
 Coral, 946a
 Corbel, 947a
 Corcoran, William Wilson, 947a.
 Corcoran Art Gallery, 947a
 Cordage, 948a
 Corday d'Armont, Marie Anne Charlotte 947b
 Cordillera, 947b 2584a, 3088b
 Cordite, 947b, 3229a
 Cordoba, Argentina, 947b
 Cordovan, 2072a.
 Corduroy 948a
 Coren 948a
 Corelli Marie, 948a
 Coriander 948a
 Corinth, Greece 948a
 Corinth Miss 948b
 Corinthian Order, 995b
 Corinthians, Epistles to the, 948b
 Coriolanus, 949a
 Cork, 949a, 2439b, 2862a
 Cork, Ireland, 949b
 Corliss George Henry, 949b
 Corm, 950a
 Cormorant, 950a
 Corn, 950b, 2482a
 Corn-Adonis, 27b
 Corn Clubs, 953b
 Corn Crake 2998a
 Cornet, 1287a
 Cornelle, Pierre, 952a
 Cornelian 708a
 Cornell, Burr, 952a
 Cornell University, 952a
 Cornet, 952b
 Cornflower 952b
 Corneille, 1235a
 Corning, N. 952b
 Corn Laws 952b
 Corn Marigold, 317b
 Corns 952a
 Corn Song, The 2034a
 Cornucopia, 953a
 Cornwall, Ont. 953a
 Cornwallis Charles, 953b
 Corolla, 519a, 953b 1354a
 Corona 953b, 1617b, 2470b
 Coronado Francisco, 953b
 Coronet 954a
 Coronet 954a
 Corot, Jean Baptiste Camille, 954a.
 Corporal, 954b
 Corporal Punishment, 954b
 Corporation, 954b
 Corporations, Holding 2641b
 Corpus Christi, Tex. 955b
 Corpuscules Tactile, 3602a
 Corpus Juris Civilis 1920b
 Correggio Antonio Allegri, 955b 2704b
 Correlation, 955b
 Correspondence Schools, 2214a
 Corrosive Sublimata, 139b, 956b
 Corrupt Practices Acts, 956a
 Comet, 956a
 Cornica 956a
 Cornicianna, Tex. 956b
 Cortes, 2372b
 Cortez, Hernando 956b
 Cortland, N. Y., 957a.
 Corundum, 957a.
 Corus, 31a
 Coshocton, Ohio, 957a
 Cosmetics 957a
 Cosmog, 957b
 Cosmoctia, 957b
 Costa Rica, 958a
 Coster, Laurens 2942a
 Costa, Bill of, 432a.
 Costume, 1148a
 Cotes, Sarah Jeannette, 958b
 Cotillion 1025a
 Cotopaxi, 958b
 Cotton, 958b, 2624b
 Cotton, John 971b
 Cotton Gin, 972a, 1823a
 Cottamseed Products 972a.
 Cotton State, The, 97b
 Cottonwood 972b, 2504a
 Cotyledon 972b, 1503b
 Cougar, 2726b, 2989a.
 Cough, 972a
 Council, 162a
 Council, City, 2434a
 Council Bluffs, Ia 973a
 Council of Chalcedon 2900b
 Council of Trent, 3631b
 Count (title), 973a
 Counterfeiting 973a
 Counterpoint, 973b
 Counter-Reformation, 973b
 Countersign, 974b
 Countess, 1165a
 Counting, 2619b
 Count of Monte Cristo, 2400b
 County, 974b, 2495a
 County Agent, 1299a
 County Attorney, 1033a
 Coup de Grace, 2359b
 Coupon Bonds, 438a
 Courland 974b
 Court, 975a
 Court Fool, 976a 1390b
 Court-martial, 976a
 Court of Claims 975a, 978b
 Court-plaster, 976b
 Courtship of Miles Standish, 177b, 976b, 2452a, 2403a
 Covenant, 977a
 Covertures, 977a
 Coventry, Eng. 977a
 Coverdale, Miles, 977b
 Coverley, Roger de 22b
 Covington, Ky, 977b
 Cow, 1012b
 Cowage 978a
 Cowbird, 977b
 Cowdery, Oliver, 2413a
 Cowitch, 978a
 Cow Farming, 978a
 Cowpens, 978a
 Cowpens, Battle of the, 978a
 Cowper, William 978b
 Cowpot, 979a, 2731a
 Cowrie, 979a
 Cowslip, 979a
 Cox James 979b
 Cox Palmer, 979a.
 Coyote 979b
 Crab 979b
 Crab Apple 979b
 Cracow, 980a.
 Craicig, Pearl Richards 980a.
 Craddock, Charles Egbert, 2426a
 Cradle of American Liberty, 1297a
 Cradle of New France, 2985a
 Crank, Dinah Maria Mulock, 980b
 Cranberry, 980b
 Crane (bird), 981a
 Crane (machine), 980b
 Crane, Stephen, 981b
 Crane, Walter, 981b
 Crane Express, The (story), 1391b
 Crane's Bill, 1491a
 Cranford, 1454a
 Cranial Nerve, 2507b
 Cranmer, Thomas, 981b, 1671b
 Crannog, 2008a
 Cranston, R. I., 982a
 Crantara 1319a.
 Craps, 982a
 Crassus, Marcus Licinius, 982a
 Crater Lake National Park, 2742a
 Crawfish 982a.
 Crawford, Francis Marion, 982b
 Crawford, Thomas, 982b
 Crawford Notch, 3566a
 Crawfordsville, Ind., 982b
 Crayfish, 982a
 Crayons, 982a
 Creamery, 982a.
 Cream of Tartar, 982b
 Cream Separator, 982b
 Creamy, Edward Shepherd, 982b
 Creasy, France, 982b
 Credit 982a
 Credit Mobilier, 984b, 3711b
 Creed 984b
 Cree Indians, 984b
 Creek Indians, 985a
 Creeper, 985a
 Crawford, Germany, 1994b
 Cremation, 985b
 Creole, 985b
 Creole State The, 2173a.
 Creosote 985b
 Crepe, 982a
 Crescent, 985b
 Crescent City, 986a, 2542a
 Cress, 982a
 Cretaceous System 986a
 Crete Island of, 986a
 Cretone, 986b
 Cribbage, 986b
 Crickton, James, 987a
 Cricket (athletic), 987b
 Cricket (insect), 987a, 2428b
 Crime, 987a
 Crimea, 988b
 Crimean War, 988b
 Criminology, 988a
 Crinoides, 988b
 Crinoline, 988b
 Cripple Creek, Col., 989b
 Crittenden, John Jordan, 990a
 Crittenden Compromise, 989b
 Cronia, 989a
 Crockett, David, 63a, 990b
 Crocodile, 990b
 Crocodile Bird, 991a.
 Crocus, 991a
 Croesus, 991a
 Croix de Guerre, 991a
 Cromwell, Oliver, 991b
 Cromwell, Thomas 992b
 Cronstadt Russia, 1395a
 Crookes, William 992b
 Crookes Tubes, 992a
 Crops, Measures for, 2302a
 Croquet 992a
 Crora, 992a
 Crosby, Fanny, 993b
 Cross 993b
 Crossed, 994a
 Cross Fertilization, 994a
 Crossing (botany), 993b
 Croton, 994b
 Croton Aqueduct, 995a
 Croup, 995a
 Crow, 995b
 Crow Blackbird, 996a
 Crowfoot 614b
 Crow Indians, 996a
 Crown (coin), 996a.
 Crown (of royalty), 996a
 Crown Colony, 996b
 Crown Grafting, 1544b
 Crown Point N. Y. 996a
 Crown's Nest Pass 72a, 561a.
 Crumble Steel, 3417b
 Cruciferae, 2445b
 Crucifixion, The, 996b
 Cruelty to Animals, 996b
 Cruelty to Children, 997a.
 Cruiser, 2497a.
 Crusades, 997a 2803b
 Crucata, 997b
 Cryolite 998b
 Crypt, 998b
 Cryptogamous Plants 1000a
 Cryptograms 518b, 518a, 2803a
 Crystalline Lens 1287b
 Crystalline Rocks, 1000a

The letter a, after a number, indicates column 1; the letter b, column 2

Crystallization, 1000a

Ctesiphon 31a.
Cuba 1000b
Cube 1004b
Cubeb 1004b
Cube Root, 1005a
Cubic Measure 1006a, 2315b
Cubist School of Painting, 1005a
Cubit, 1006b
Cuckoo, 1006b
Cucumber, 1007a
Cucumber Tree, 2220b
Cuda, 1007a
Cullom, Shelby Moore 1007a
Cumberland, Md., 1007a
Cumberland Mountains 1007b
Cumberland River, 1007b
Cumberland Road 1007b
Cummins, Albert Baird, 1007b
Cuneiform Inscriptions, 1008a
Cupellation 1531a
Cupid, 1008b, 2958a
Cupola 1008b, 1093a
Curassow, 1008b
Curculio, 1008b
Curfew, 1009a
Curie Pierre and Marie Sklodowska 1009a
Curler, 1009a
Curling, 1009a
Current 1009b
Currency, Law of 1913 334b
Currie, Arthur W. 1009b
Curtis George William 1010a
Curtiss, Glenn Hammond, 1010a, 1351b
Curve, 1010b
Curwood, James Oliver, 1010b
Curzon, George Nathaniel, 1010b
Cush 10b
Cushman, Charlotte, 1011a
Custer, George Armstrong, 1011a
Custis, Martha, 3818b
Customs Duties 1011a
Cut Glass 1525b
Cuticle 3319a
Cutis, 3319b
Cutler, Manassah, 2643b
Cutlery, 1011b
Cuttlefish, 1012a, 3254b
Cutworm 1012a
Cuvier, George Leopold Christian, Frederic Dagobert, 1012a
Cyanide Process, 2309a
Cyanogen, 1012b
Cyrus, 1012b
Cyzares 311b
Cyclades 1012b
Cyclamen, 1012b
Cyclometer 3350b
Cyclone, 1012b, 3598a
Cyclopedic 1224a
Cyclops 1012a
Cylinder, 1012a, 2299b
Cylinder (art), 1135b
Cylinder Press, 2943a
Cymel, 1013b
Cnic 1013b
Cnic School of Philosophy, 1013b
Cypress 1014a
Cyrus 1014b
Cyrus de Bergerac 3120b
Cyrus 423b
Cyrus (the Younger) 1015a
Cyrus the Great 1014b, 2795a
Cystic Duct, 1423b
Czár, 1015a, 3095a
Czech 1015a
Czechoslovak Republic, 301b, 1015b
Czechoslovak 2995a
Czernin Count 300b
Czernowitz 1016a
Czolfowicz Leon, 2308a

D

D, 1017a
Dabchick, 1017a
Dace, 818a, 1017a
Dachshund, 1017a
Dactylic Meter, 2311b
Daddy-long-legs, 1017a
Daedalus, 1017b
Daffodil, 1017b, 2474a
Daffy Dilly, Adventures of, 1843b
Dago Island, 1017b
Daguerre, Louis Jacques Mandé, 1018a
Daguerreotype, 1017b, 2417b
Dahlgren, John Adolph, 1018a
Dahlia, 1018b
Dahomey, 1018b
Dairy and Dairying, 729a, 1019a
Dairy Cattle, 729a
Daisy, 517b, 1021a
Dakin's Solution, 3947b
Dakota Indians, 3313a
Dallas, George Mifflin, 1021b
Dallas, Tex., 1021b, 3552b
Dalles, 1022a
Dalles, The, Oregon, 1022a
Dalmatia, 1022a
Dalmores, Charles, 1022b
Dam, 1022b
Damages, 1023a
Damasus, Syria, 1023a
Damasus Steel, 1023b
Damask, 1023b
Damascene, 1023b
Damos, 1023b
Damon and Pythias, 1023b
Damosch, Leopold, 1024a
Damosch, Walter Johannes, 1024a
Dan, 1024a
Dana, Charles Anderson, 1024b
Dana, James Dwight, 1024b
Dana, Richard Henry, Jr., 1024b
Danbury, Conn., 1024b
Dancing, 1025a
Dandelion, 1025b, 1357b
Dandruff, 1025b
Dandy Horse, 427b
Dane, Great, 1555a
Danelagh, The, 85a
Daniel, 421a, 1026a
Daniell Battery, 1026a
Danish West Indies, 1026a, 3775a
Dante Alighieri, 270a, 1026a
Danton, Georges Jacques, 1027a
Dantzic, (city), 1027b
Danube River, 1027a
Danville, Ill., 1027b
Danville Va., 1027b
Danzig (city), 1027b
Daphne, 1028a, 2463a
Dardanelles, 1028a
Dare Virginia, 3781a
Darwin, Gulf of, 1028b
Darwin Scheme, 1028a
Darius, 423a, 1029a, 2795a
Darius III, 1029a
Dark Ages 1029b
Dark Continent, 33b
Darling Grace Horsley, 1029b
Darmstadt Germany, 1029b
Darnel, 1029b
Darney, Henry Stuart, 1030a
Dart, 1030a
Dartmouth, N. S., 1030a
Dartmouth College, 1030a
Dartmouth College Case, 1030b
Darwin Charles Robert, 1030b
Date, 1031a
Date Plum, 2796b
Daudot, Alphonse, 1031b

Daughters of the American Revolution, 1032a
Dauphin, 1032a
Davenport, Tannr., 1032a
Davenport, Ia., 1032a
David, 417a, 1032b
David Copperfield, 1032a, 2133a
Davies, Louis Henry, 1032b
Davis, David, 1033a
Davis, Jefferson, 1033a
Davis, Rebecca Harding, 1033b
Davis, Richard Harding, 1033b
Davis, Samuel, 1034a
Davis Strait, 1034a
Davitt, Michael, 1034a
Davy, Humphry, 1034a
Daves, Charles Gates, 1034a
Dawson, John William, 1034b
Dawson, Yukon District, 1034b
Day, 1034b, 1462a
Day, William Rufus, 1035b
Day Fly, 2244b
Day Is Done, The, 2026b
Daylight Saving, 1035b
Day Lily, 1035b
Days of Grace, 1543b
Dayton, Alston, 1776b
Dayton, Ohio, 1035b
De, 1036a
Deaconess, 1036b
Dead-Letter Office, 1036b
Dead Reckoning, 1037a
Dead Sea, 1037a
Deadwood, S. D., 1037a
Deaf and Dumb, 1037a
Dearborn, Henry, 1039a
Death, 1038a
Death Adder, 3775b
Death's-head Moth, 1039a
Death Valley, 507b, 1038a
Debate, 1039b
Debiture Bonds, 497b
Deborah, 1041a
Debs, Eugene Victor, 1041a
Debt, 1041b
Debussy, Claude Achille, 1041b
Decalogue, 1042a
Decatur, Ill., 1042a
Decatur, Stephen, 1042a
Decan, 1042b
December, 1042b
Decemviri, 1042a
Deciduous Trees, 1043a
Declaration, 1043a
Declaration of Independence, 1043b
Declaration of War, 2802b
Declination, 1045b
Decline and Fall of the Roman Empire, 1508b
Decomposition, 1045b, 2972a
Decorative Design, 1125a
Decoy, 1046a
Deduction, 1046a
Deductive Method, 1046a
Deductive Philosophy, 222a
Deep-sea Fishes, 1311a
Dee River, 1046b
Deed, 1046b
Deer, 1047b
Deer Mouse, 1887a
De Facto, 1048a
DeKoe, Daniel, 1048a
Degeneration, 1048b
Degustion, 2475a
Degree, 1048b
Degree, Bachelor's, 312a
Deianira, 1676b
Defilection, 146a
De Jure, 1048a
DeKalb, Ill., 1049a
DeKalb, Johann, Baron, 1049b
DeKoven, Reginald, 1049b
Delagoa Bay, 1049b
Deland, Margaretta Wade Campbell, 1050a
Delaroché, Paul, 1050a
Delaware, 1050a
Delaware, Lord, 1052a, 3779b

- Delaware, Ohio, 1062b
 Delaware Bay, 1063a
 Delaware Indians 1062b
 Delaware River, 1063a
 Delaware Water Gap 1063a
 Delcassé, Théophile, 1063a
 Delta, Netherlands, 1063a
 Delta, India, 1063b
 Delian League 272a
 Deliberation, 2873a
 Delilah, 1064a 3182a
 Delirium 1064a
 Delirium Tremens 1064a
 Deliverance of Saint Peter, 2708a
 Delos 1064a
 Delphi 1064a
 Delaune François Alexandre, 1064b
 Delta 1064b 3080a
 Deluge 1065a
 Demarcation Line of, 1065a
 Dementia, 1806b
 De Mille, James 1065a
 Democracy, 1842a
 Democratic Donkey, 2476a
 Democratic Party, 1065b, 2387a
 Democratic-Republican Party, 2387a 3052a, 3706b
 Demosthenes 1066a
 Demotic Writing, 1066a
 Demurrer 1066a
 Denarius 1066a 2781a
 Denatured Alcohol 78a
 Denison Tex. 1066b
 Denmark 1066b
 Denmark's Colonies 864b
 Density, 1069a
 Dental Schools 1069a
 Denishone 382a
 Dentistry, 1069b
 Denver, Colo. 1069a
 Denver University of, 1069a
 Department 1069a
 Department of the Navy, 5497b
 Department of State, 2410a
 Department of War, 3503a
 De Pauw University, 1069a
 Dupuy, Chauncey Mitchell, 1069a
 Depth of Ocean 2631b
 DeQuincey, Thomas, 1069a
 Derby Eng. 1069b
 Dermis 2319b
 Der Ring des Nibelungen, 3796a
 De Reszke (family), 1069b
 Derrick, 1062a
 Derish 1062a
 Descartes René 1062b
 Descending Colon, 5b
 Descent from the Cross The, 3074a, 3128a
 Deschneul, Paul, 1062b
 Desert 1062b
 Deserted Village, 1533b
 Desire 3873a
 Des Moines Ia., 1062a
 Des Moines Plan 1063a
 Des Moines River, 1063b
 DeSoto, Fernando 1063b
 Destinn Emmy, 1063b
 Detector, 3532a
 Determinism 1301b
 Detroit, Mich., 1064a
 Detroit River 1065b
 Deuotion 1066a
 Deuteronomy 1066a
 Deutsch 1493b
 Devil, 1066a
 Devil Fish, 1066b
 Devil's Darning Needle 1111a
 Devil's Horse 3797b
 Devils Lake N. D. 1066b
 Devil Worship 1066b
 Devonian Period 1066b
 Devonian System, 1087a
 Devonshire Victor Christian William Cavendish, 1087a
 Dew, 1067b
 Dewey, George 1068a
 Dewey, John, 1068b
 Dewey, Melvil, 1068b
 Devtrick, 1068a
 Diabase, 1068b
 Diabasis, 1069a
 Diacritical Marks, 2681a
 Diagonal Scale, 1069a
 Dialect, 1069b
 Diameter, 525b
 Diamond 461a 767b 1069b
 Diamond Head, 3617a
 Diana 1070b
 Diaphragm, 1071a
 Dias, Bartholomew, 1071a
 Diatom 1071a
 Diatomic Scale, 3289a
 Diaz, Porfirio, 1071a, 2322a
 Dibasic Acid, 14a
 Dice 1071b
 Dickcissel 1071b, 3376b
 Dickens, Charles 438a 1072a
 Dictyodonta 611a, 816b, 972b
 Dictator, 1072a
 Dictionary, 1073a
 Dictograph 1074a
 Didactic Poetry, 1074a
 Dido 30b 1074a
 Die 1074b
 Dielschle 1074b
 Die-sinking, 1074b
 Diet, 1075a
 Diet (meeting), 1075a
 Diet of Worms 2040a
 Diffraction 1076a
 Diffusion, 1076b
 Digestion 1076b 1367b
 Digit, 1076a 3318b
 Digitals 1388a
 Dike, 1076a
 Dillon, John, 1076a
 Dime 1076b
 Diameter (in poetry), 2311b
 Dimity, 1076b
 Dingle's Bill, 1076b, 3516b
 Dingo 1076b
 Dinosauros, 1076b
 Dinwiddie, Robert, 1077a
 Diocletian, 1077a
 Diogenes 1077a
 Diomedes 1077a
 Dionaea, 3753b
 Dionysus the Elder, 1077b
 Dip 1077b
 Diptheria, 784a 1077b
 Diptheria 1078a 2682b
 Diplodocus, 1077a
 Diplomacy 1078a
 Dipper, 1078b
 Dipping Needle 1078b
 Dipomania 1079a
 Diptera 1360a
 Directory, 1079a
 Dirigible Balloons 1364b
 Disarmament 229b
 Disciples of Christ, 1079a
 Discipline, 781a
 Discobolus 1079b 3240b
 Discount 1079b
 Discus Throwing the, 274b, 1079b, 3221a
 Disease 1079b
 Diseases of Plants 1080a
 Disinfectants 1080b
 Dispensary 1081a
 Dispensation 1081a
 Displacement 3283a
 Disraeli, Benjamin 1081a
 Distemper (disease) 1081b
 Distillation 1081b
 Distilled Liquors 1082b
 Distinguished Service Cross, 1082b
 Distinguished Service Medal, 1082a
 District Attorney, 1082a
 District of Columbia 1083b
 Diver, 1084a
 Divide, 1084b, 3830b
 Dividers 804a
 Dividend 1084b
 Division 1085a
 Divine Comedy, The, 1026b
 Divine Right of Kings, 1085a
 Diving 1085a 346a
 Diving Beetle, 3226a
 Divining Rod 1085b
 Division (army), 327a
 Divorce 1085b
 Dixie, 1086a
 Dixie Highway, 1086a
 Dixon Thomas, 1087a
 Dileper, 1087a
 Dniester, 1087a
 Dobruja 1087a
 Dock 1087b
 Dockyards 1088a
 Doddie, 820b 1088a
 Dodgson, Charles Lutwidge, 1088b
 Dodo 1088b
 Dog, 1089a 2489b, 2490a, 3981a
 Dogbane, 1091a
 Dog Days 1091b
 Dog 1091b 3762a
 Dogfish 1091b
 Doggerbank 1091b
 Dogma, 1091b
 Dog of the Forest, 2053b
 Dogstar 1092a
 Dog-tooth Violet, 1092a
 Dogwatch 1092a
 Dofel Giovanni de, 3314b
 Doldrums 1092a
 Dole Sanford Ballard, 1092a 1648b
 Doll, 1092a
 Doll, A Discarded, Speaks on a Christmas Day, 3555b
 Dollar, 1092b
 Dollar Diplomacy, 3502b
 Dolomite 1092b
 Dolphin, 1092a
 Dombey & Son, 2384a
 Dome 1093a
 Domenichino 1093b
 Domes of the Rock, 1889a, 3537b
 Domestic Book 1093b
 Domestic Commerce, 3688a
 Domestic Science 1094a
 Dominica 1104b 3821b
 Dominicans 1108a
 Dominion Div 1108a 1915b
 Dominion Lands 2614b
 Dominion Notes 2378a
 Dominion of Newfoundland, 2527b
 Dominion of New Zealand, 2562b
 Dominion Parliament, 2744a
 Dominos 1108a
 Domitian 1108b
 Dom Pedro II 547a
 Donatello 1108b
 Donati's Comet, 398a
 Donatist 1108b
 Don Cervo de Baran 2277b
 Don Cossacks 867b
 Dongola 1108a
 Donizetti Gretaano 1108a
 Don Juan 620a, 1108a
 Donkey in the Lion's Skin The, 3425b
 Donnelly Ignatius 1108a
 Don Quixote 605b, 1108b, 742a
 Don River, 1108b
 Dooley, Mr. 1156a
 Dorcas 1456b
 Doré Paul Gustave, 1106b
 Dorians 1106b
 Doric Order 855b
 Dormer Widow 1106b
 Dormouse 1106b
 Dorr's Rebellion, 1107a
 Dortmund Germany, 1107a
 Dory, 2852a

The letter a, after a number, indicates column 1; the letter b, column 2

Dou, Gerard, 1107a.
 Double Bible, 1107b.
 Double Acrostic, 15a.
 Double Stars, 1107b.
 Doubtlet, 1144a.
 Dougherty, D. J., 1107b.
 Doughfaces, 3007b.
 Douglas, Arizona, 1107b.
 Douglas, Stephen Arnold, 1107b, 3395b.
 Douglas, William, 129b.
 Douglas Fir, 2875a.
 Doum Palm, 1108b.
 Douma, 1152b.
 Douro River, 1108b.
 Dove, 1108b.
 Dover, Del., 1109a.
 Dover, Eng., 1109a.
 Dover, N. H., 1109a.
 Dover, Strait of, 1109b.
 Dow, Neal, 1109b.
 Dowager Queen, 2987a.
 Dowden, Edward, 1109b.
 Power, 1109b.
 Powie, John Alexander, 1109b.
 Doyle, Arthur Conan, 1110a.
 Brachma, 1110a, 3505a.
 Draco, 271b, 1110b.
 Draft, 1110b.
 Drarting, 322a.
 Dragon, 1110b.
 Dragon Fly, 1111a.
 Drainage, 1101a, 1111a.
 Drainage Canal, 1112a.
 Drainage Tubes, 1112b.
 Drainage, 427b.
 Drake, Francis, 1112b.
 Drakensberg Mts., 1113a, 3610a.
 Drama, 1113a.
 Draper, Andrew Sloan, 1116a.
 Drive, 1116b.
 Dravidians, 1116b, 1780a.
 Drawbridge, 557a.
 Drawing, 1116b.
 Dreadnaught, 2496b.
 Dream, 1149a.
 Dream Life, 2372a.
 Dredging, 1142a.
 Dred Scott Decision, 1142a.
 Dreiser, Theodore, 1142b.
 Dresden, Germany, 1142b.
 Dresden China, 1142a.
 Dress, 1143a.
 Draw, John, 1144a.
 Drexel, Anthony Joseph, 1144b.
 Drexel Institute, 1144b.
 Dreyfus, Alfred, 1144b, 3979a.
 Drift, 1145a.
 Drill (agriculture), 3369a.
 Dromedary, 1145a.
 Dropsy, 1145a.
 Dropwort, 3386b.
 Drowned Valley, 3734a.
 Drowning, Rescuing from, 1145a, 3386a.
 Drugist, 1145a.
 Druids, 1145b.
 Drum, 1146a.
 Drummond, Henry, 1146b.
 Drummond, William Henry, 1146b.
 Drummond Island, 2241b.
 Drunkenness, 76b.
 Druses, 1146b.
 Dryads, 1147a, 2625b.
 Dry Battery, 1196a.
 Dryden, John, 1147a.
 Dry Docks, 1088a.
 Dry Farming, 1147b.
 Dry Rot, 1148a.
 Dry Tortugas, 1148a.
 Dual Alliance, 3636a.
 DuBarry, Marie Jeanne Becu, 1148a.
 Dublin, Ireland, 1148a.
 Dublin University of, 1148b.
 Dubois, Pa., 1148b.
 Dubuque, Ia., 1149a.
 Ducat, 1149a.
 Duchess, 1151b.

Duchy, 1149a.
 Duck, 1149b.
 Duck-billed Platypus, 1150a.
 Duckling Stool, 1150b.
 Duckling, The Ugly, 2025a.
 Ductility, 1150b.
 Duel, 1150b.
 Dufferin and Ava, Frederick Temple Hamilton Blackwood, 1151a.
 Dugong, 1151a.
 Duisburg, Germany, 1151b.
 Duke, 1151b.
 Dukhobors, 1151b.
 Dulcimer, 1151b.
 Duluth, Minn., 1152a.
 Duma, 1152b.
 Dumas (family), 1152b, 1153a.
 Du Maurier, George Louis Palmella Bussan, 1153a.
 Dumb-bells, 1153a, 1602a.
 Dumdum Bullets, 598a.
 Dunaburg, 1153b.
 Dunbar, Paul Laurence, 1153b.
 Duncan, King, 3223b.
 Duncan, Norman, 1153b.
 Dundas, Ont., 1153b.
 Dundee, Scotland, 1154a.
 Dune, 1154a, 1480a.
 Dunedin, New Zealand, 1154a.
 Dunkers, 1154b.
 Dunkirk, France, 1154b.
 Dunkirk, N. Y., 1154b.
 Dunmore, Pa., 1155a.
 Dunne, Finley Peter, 1155a.
 Duns Scotus, John, 1155a.
 Duodenum, 5b, 1822a.
 Dupin, Armandine Lucile Aurore, 3183b.
 Duquesne, Pa., 1155a.
 Dura Mater, 542a.
 Durango, Mex., 1155a.
 Durant, Henry Fowle, 3846a.
 Durban, South Africa, 1156b.
 Durbar, 1156b.
 Durer, Albrecht, 1156b.
 Dures, 1156b.
 Durham, John George Lambton, 1156b.
 Durham, N. C., 1156a.
 Durhams, 728b.
 Duse, Eleonora, 1156a.
 Dusseldorf, Germany, 1156b.
 Dust, 1156b.
 Dutch Colonies, 833a.
 Dutch East Indies, 1157a.
 Dutch Guiana, 1157a.
 Dutch Metal, 1157a.
 Dvina River, 1157b.
 Dvinsk, Russia, 1157b.
 Dvorak, Antonin, 1157b.
 Dwarf, 1157b, 1293b.
 Dwarf Birch, 449a.
 Dwarfing, 1158a.
 Dwight, Timothy, 1158a.
 Dyaks, 1158a.
 Dyeing, 1158a.
 Dynamics, 1159a, 2289b, 3401b.
 Dynamite, 1159b.
 Dynamo, 1159b, 1205a.
 Dynamometer, 1160a.
 Dyne, 1159a, 1160b.
 Dysodile, 1160b.
 Dyspepsia, 1160b.

E

E, 1161a, 2632a.
 Eads, James Buchanan, 1161a, 1893a.
 Eagle (bird), 1161b.
 Eagle (coin), 1162b.
 Eagle (standard), 1162b.
 Eagle Wood, 101b.
 Eames, Emma, 1162b.
 Ear, 1163a.
 Earl, 1165a.
 Early, Jubal Anderson, 1165a.
 Earring, 1165b.
 Ear Shell, 2a.
 Earth, 1165b, 1479a, 1480b.
 Earth, Origin of the, 1476b.
 Earth Currents, 1168a.
 Earthenware, 2921b, 2925b.
 Earthquake, 1168a.
 Earths, 1169a.
 Earth Skin, 1169a.
 Earthworm, 1169b.
 Earwig, 1169b.
 Easement, 1169b.
 Easter, 1170a.
 Easter Lily, 1170a.
 Eastern Question, 1170a.
 Eastern Republic of Uruguay, 3723b.
 East Flanders, 1344a.
 East India Company, 1170b.
 East Indies, 1170b.
 East Liverpool, Ohio, 1170b.
 Easton, Pa., 1171a.
 East Orange, N. J., 2668a.
 East River, 1171a.
 East Saint Louis, Ill., 1171a.
 Eau Claire, Wis., 1171b.
 Eau de Cologne, 1171b.
 Ebenezer, 1171b.
 Ebers, George Moritz, 1171b.
 Ebert, Friedrich, 1172a, 1502b.
 Ebony, 1172a.
 Eccentric, 1172b.
 Ecclesiastes, 1172b.
 Echidna, 1172b.
 Echinoderms, 1173a, 3405a.
 Echinus, 3244a.
 Echo (mythology), 1173a, 2483b.
 Echo (physics), 1173a.
 Eck, Johann Maier von, 1173b.
 Eclectics, 1173b.
 Eclectic School of Medicine, 1173b.
 Eclectic System, 2822b.
 Eclipse, 1174a.
 Ecliptic, 1166b, 1174b.
 Ecole des Beaux Arts, 1174b.
 Eclogues, 375a.
 Ecology, 1175a.
 Economics, 1175a.
 Ecuador, 1176a.
 Eczema, 1177b.
 Edda, 1178a.
 Eddy, Clarence, 1178a.
 Eddy, Mary Baker, 814b, 1178a.
 Eden, 1178b.
 Edentata, 1178b.
 Edgar, Aethelred, 1179a.
 Edict of Nantes, 2463a.
 Edinburgh, Scotland, 1179a.
 Edinburgh, University of, 1180a.
 Edison, Thomas Alva, 1180a, 1823a, 3530a.
 Edmonton, Alberta, 1180b.
 Edom, 1181a.
 Education, 1181a.
 Education, Bureau of, 1182b.
 Education, Pre-Vocational, 3785b.
 Education Association, National, 1183a.
 Education in the United States, 3699a.
 Edward the Confessor, 1183b.
 Edward, The Black Prince, 1183b.
 Edward I, 1183b.
 Edward II, 1183b.
 Edward III, 1184a.
 Edward IV, 1184a.
 Edward V, 1184b.
 Edward VI, 1184b.
 Edward VII, 1184b.
 Edwards, Jonathan, 1185a.
 Eel, 1185a.
 Egbert, 1185a.
 Egg, 1098a, 1185a.
 Eggleston, Edward, 1186a.
 Eggplant, 1186a.
 Eglantine, 1186b, 3484a.

Essay, 1255b
 Essays of Elia, 2009b
 Essays on Corn, 954a
 Essed Pasha, 69a
 Essen, Germany, 1255a
 Estate, 1255a
 Esther, Queen, 424a, 1256b
 Esthetics, 1256b
 Esthonia, 1255b
 Estuary, 1257a, 3080a
 Estufa, 355a
 Etching, 1257a
 Etolian Winds, 1257b
 Ethelwulf, 85a, 1257b
 Ether, 1257b
 Ether (in medicine), 1257b
 Ethical Training, 1253a
 Ethics, 1258a
 Ethiopia, 1254b
 Ethiopian, 2994b
 Ethnography, 1255a
 Ethnology, 1255a
 Ethyl Alcohol, 75a
 Etiolation, 1255a
 Etna, 1255a
 Etton College, 1255b
 Eturia, 1255b
 Etruscan Vases, 1256a
 Etymology, 1255a, 1548a
 Euboea, 30a
 Eucalyptus, 1256a
 Eucharist, 1256b
 Eucher, 1256b
 Euclid, 1257a
 Euclid, 47th Problem in, 2976a
 Eugene, Ore., 1257a
 Eugenics, 1257a
 Eugenia-Marie de Montijo, 1257b
 Euphorbiaceae, 3394a
 Euphrates, 1255a
 Euphrosyne, 1548b
 Eurasians, 1258a
 Eureka, Calif., 1258a
 Eureka Springs, Ark., 1258b
 Euripides, 1258b
 Europa, 1258b
 Europa, Story of, 2450a
 Europa, 1259a
 Europa, Races of, 2994b
 Europa, 31a
 Eurydote, 1278a
 Eustachian Tubes, 1278a
 Eustachio, Bartolommeo, 1278a
 Eutaw Springs, Battle of, 1278a
 Euterpe, 1278b, 2433b
 Evangelical Alliance, 1278b
 Evangelical Association, 1278b
 Evangeline, 465a, 1279a, 1548b
 Evans, Robley Dunglison, 1279a
 Evanston, Ill., 1279a
 Evansville, Ind., 1279b
 Evaporation, 1279b, 2837b
 Evars, William Maxwell, 1280a
 Evening Schools, 1280a
 Evening Star, 1280b
 Everest, Mount, 1280b
 Everett, Edward, 1280b
 Everett, Wash., 1280b
 Everglades, 1281a
 Evergreen, 1281a
 Evergreen State, 3808a
 Everlasting Flower, 107b, 1281a
 Evolution, 1281b, 3882a
 Exaltation, 148a
 Excalibur, 1281b
 Ex Cathedra, 2902b
 Excavations in Ancient Lands, 1282a
 Excellence, 24a
 Exchange, 1282b
 Exchange, Bill of, 432a
 Exchequer, Chancellor of the, 1282b
 Exchequer Court of Canada, 1282b

Excise Tax, 1283a
 Excluded Middle, Law of, 3570b
 Executive Council (Canada), 1283a
 Executive Department, 1283b, 3623b
 Executive Mansion, 3865a
 Executor, 1283b
 Exergues, 2830a, 2842b
 Exergue, 2821b
 Exeter, 1283b
 Exile, 1284a
 Exodus, 1284a
 Exogenous Plants, 1284a
 Exorcism, 1284a
 Exotic, 1284a
 Expansion, 1284b
 Expansion, Territorial, of the United States, 3595b
 Expectation, 1284b
 Experiment, Farms and Stations, Canadian, 52a
 Expiration, 549b
 Explorations, 2603b, 3366b
 Explosives, 1284b
 Exposition, Industrial, 1285a
 Ex Post Facto Law, 1285b
 Express Company, 1285b
 Express Money Orders, 2287a
 Express Train (game), 1439a
 Extension, 1285a
 Extraterritoriality, 1285a
 Extract of Beef, 377a
 Extractives, 1098b
 Extracts, 1285b
 Extradition, 1286b
 Extradits, 158a
 Extrajudicial Oath, 2827b
 Extreme Unction, 3566b
 Eyek (family), 1285b
 Eye, 1287a
 Ezekiel, 1289b
 Ezra, 1289b

F

F, 1290a
 Fabius, 1290a
 Fabie, 1290a, 2022a, 2029a
 Fabricord, 2073a
 Facade, 1290b
 Face, The, 1290b
 Faces, False, 1291a
 Factor, 1291a
 Factory Legislation, 1291b
 Faerie Queene, 3883a
 Faunir, 3802a
 Fahrenheit, Gabriel Daniel, 1292b
 Fahrenheit Scale, 3563b
 Falence, 1292b
 Fainting 1292b
 Fair, 1292b
 Fairbanks, Alaska, 1293a
 Fairbanks, Charles Warren, 1293a
 Fairfax, Thomas, 1293a
 Fair God, The, 5795a
 Fairies, 1293b
 Fairmont, W. Va., 1294a
 Fair Oaks, Battle of, 1294a
 Fairweather, Mount, 1294b
 Faith Cure, 1294b
 Fakirs, 1294b
 Falcon, 1294b
 Falconio, Diomede, 1295a
 Falkland Islands, 1295b
 Fallen Timbers, Battle of, 2843a
 Fallières, Clément Armand, 1295b
 Falling Bodies, 1295b, 2836a
 Falling Sickness, 1247a
 Fall River, Mass., 1295a
 False Grip, 377b
 False Imprisonment, 1296b
 False Pretenses, 1296b

Fame, Temple of, 3796b
 Family (biology), 1296b
 Famine, 1297a
 Fandango, 1297a
 Faneuil Hall, 1297a
 Fantaia, 2861b
 Faraday, Michael, 1297b
 Faradism, 1297a
 Farallone Islands, 1298a
 Farce, 1298a
 Farcy, 1518b
 Far Eastern Question, 1298a
 Fargo, N. D., 1298b
 Faribault, Minn., 1298b
 Farm Board, Federal, 1298b
 Farm Credits, 3134b
 Farmers Institute, 1299a
 Farm Loan Associations, National, 3135a
 Farm Loan Board, Federal, 3134b
 Farm Sowerage, 3264b
 Farms in Canada, 50a
 Farne Islands, 1299a
 Farnese (family), 1299b
 Farnese Bull, 1299b
 Farnese Hercules, 1299b, 3233b
 Farnese Palace, 1299b
 Farro Islands, 1299b
 Farragut, David Glasgow, 1300a
 Farrar, Fred K. W., 1300b
 Farrar, Geraldine, 1300b
 Farthing, 1300b
 Fasses, 1300b, 2098b
 Fascist, 1300b
 Fashion, 1300b
 Fasts and Fasting, 1301a
 Fat, 1301a
 Fatalism, 1301b
 Fata Morgana, 1301b
 Fat-Bell, 2298a
 Fates, 1301b
 Father, 1302a
 Father-lasher, 1302a
 Father of Angling, 1302a
 Father of Comedy, 1302a
 Father of English History, 1302a
 Father of English Poetry, 1302a
 Father of English Prose, 2121a
 Father of Epic Poetry, 1302a
 Father of Greek Tragedy, 1302a
 Father of His Country, 1302a, 3817a
 Father of History, 1302a, 1678b
 Father of Lies, 1302a
 Father of Medicine, 1302a
 Father of Modern Philosophy, 1052b
 Father of the Faithful, 1302a
 Father of Water, 1302a
 Father Tiber, 3577b
 Fathom, 1302a, 3843b
 Fatigue, 1302a, 2843b
 Fatima, 477a
 Fats, 1302a
 Fatty Degeneration, 1302b
 Fault, 1302b
 Faun, 1302a
 Fauna, 1303a
 Faure, François Félix, 1303a
 Faust, Johann, 1303a
 Pawkes, Guy, 1598b
 Feasts, 1312a
 Feathers, 1303b
 February, 1304a
 Federal Farm Loan Board, 3134b
 Federal Hall, 1304b
 Federalist, The, 1304b
 Federal Land Banks, 3135a
 Federal Party, 1305a, 2886b, 3705b
 Federal Reserve Banks, 334b
 Federal Reserve Board, 335a
 Federal Reserve Notes, 2886a

- Federal Trade Commission, Figures of Speech, 1320b, 1305a
 Federated Malay States, 1305a
 Feeble-minded, Education of, 1305b
 Feeling 2959a
 Fee Simple, 1255a, 1306a, 1307b
 Fee Tail, 1255a
 Feldspar, 1307b
 Fellah, 1187b, 1307b
 Fellowship 1308a
 Felony 1308a
 Felt, 1308a
 Femur, 1308a, 3318b
 Fencing, 1308a
 Fénelon, François de Salgnaac, 1308b
 Fenians, 1308b
 Fennel, 1308a
 Fer-de-lance, 1309a
 Ferdinand Archduke Franz, 1400a, 3915a
 Ferdinand I (Bulgaria), 1309a
 Ferdinand I (Hol) Roman Emperor, 1309b
 Ferdinand II (Holy Roman Emperor), 1309b
 Ferdinand II (Two Sicilies), 1309b
 Ferdinand IV (Two Sicilies), 1309b
 Ferdinand V (Aragon), 1310a, 3373b
 Fermentation 1310a
 Fermented Liquors, 1310b
 Fern, 1310b
 Fern Islands, 1339a
 Ferrara, Italy, 1311a
 Ferrero Guglielmo, 1311a
 Ferret, 1311a
 Ferris Wheel, 1311b
 Ferrus Sulphate, 3467b
 Fertilization, Cross, 394a
 Fertilization of Plants, 394a, 2934b
 Ferulisers, 1311b
 Fessenden, Mrs Clementina, 1322a
 Festivals 1312a
 Fetish, 1312b
 Feud, 3748a
 Feudal System 1312b
 Fever, 1314a, 2229a
 Feverfew 1314b
 Fez, 1314b
 Fez, Morocco, 1314b
 Fezzan 1314b
 Fiat Money, 1315a
 Fiber, 1315a
 Fibrin, 1315a
 Fibula, 3318b
 Fichte Johann Gottlieb, 1315b
 Fiction, 1315b
 Fiddler Crab, 1317a
 Fief, 1314a
 Field, Cyrus West, 1317a
 Field, Eugene, 1317b
 Field, Marshall, 1318a
 Field, Stephen Johnson, 1318a
 Field Artillery 236b
 Field Columbian Museum, 1318b
 Field Glass 1318b
 Fielding, Henry, 1318b
 Field Magnet, 1360a
 Field Marshal, 1319a
 Field of the Cloth of Gold, 1319a
 Fiery Cross, 1319a
 Fife, 1319a
 Fifteen Decisive Battles, 1319a
 Fifty-four Forty or Fight, 1319a
 Fig, 1320a
 Figaro, 1320b
 Fighting Temeraire, The, 1320a
 Figures, Learning to use, 2620a
 Figures, 1320b
 Figurines, 1320b
 Fiji Islands, 1321a
 Filament, 1324a
 File, 1321b
 Filefish, 1321b
 Filibusters, 1321b
 Filipey, Alessandro, 529b
 Filippa, 2617b
 Fillmore Millard, 1322a
 Filter, 1324a
 Finch, 1324b
 Findlay, Ohio, 1324b
 Pine, 1325a
 Pine Arts 1325a
 Pinguicula, 1325a
 Finger Print Identification, 1325a
 Finland, 1325b
 Finland Gulf of, 1325a
 Finley, John H, 1326b
 Finnan Haddie, 1607a
 Finns, 1326b
 Fins, 1326b
 Finsen, Niels Ryberg, 1327a
 Fiori, 1327a
 Fir, 1327a
 Fire, 1327b
 Fire Alarm, 1327b
 Firebird, 328a
 Fire Clay, 1328a
 Firecrackers 1328a
 Fire Damp, 1328b, 2311b, 2158b
 Fire Department, 1328b
 Fire Engine, 1328b
 Fire Escape, 1328b
 Fire Extinguisher, 1328a
 Firefly, 1329b
 Fire Insurance, 1314a
 Fireless Cooker, 1329b
 Fire on the Mountains (game), 1441a
 Fire Opal 2663a
 Fireproofing, 1329b
 Fireworks, 1329b
 Fire Worship 1330a
 First Aid, for the Injured, 1330a
 First In, First Out, (game), 1440b
 First Lord of the Admiralty, 37a
 First Triumvirate, 2992a
 Fish, 1330b, 1457a, 2459a, 2490a, 3682a, 3825a
 Fish Commission, U S, 1333b
 Fish Crow, 395b
 Fish Culture, 1333b
 Fisher, Dorothy Canfield 1333b
 Fisher, Harrison 1333b
 Fisher, Irving, 1334a
 Fisheries in Canada, 365a
 Fish Hawk 1334a
 Fishing, 1334b
 Fishing Eagle, 1334a
 Fishing-trog, 1335a
 Fishing Laws, 1437b
 Fiske, John, 1336a
 Fiske, Minnie Madden, 1336a
 Fisk University 1336a
 Fitch, John 1336b, 3282b
 Fitch, (William) Clyde, 1336b
 Fitchburg Mass, 1337a
 Fize, 2467b
 Fitzgerald, Edward, 1337a
 Flume 1337a
 Five Civilized Tribes, 1337b
 Five Classics 302a
 Five Flocks, Battle of, 1337b
 Five Nations, The, 1338a
 Fixed Stars, 1338a
 Ford, 1337a
 Flag, 1338b
 Flag Development of the, 3695b
 Flag, United States, 1339b, 3119b
 Flagpole, 1341b
 Flaggs, James Montgomery 1341b
 Flag Officer, 1341b
 Flag of the Governor-General, 1342b
 Flag of the Prophet, 1341b
 Flags of the British Empire, 1341b
 Flamboyant, 1342a
 Flame, 1342a
 Flamingo, 1343a
 Flaminio, 1343a
 Flammation, 1343b
 Flammation, 1344a
 Flannel, 1344a
 Flatfish, 1344b
 Flathead, 1344b
 Flax, 1344b
 Flea, 1345a
 Fleabane, 1345b
 Flemings, 2625b
 Flemish Language, 1345b
 Fletcher, Frank Briday, 1345b
 Fletcher, John, 370b
 Fletcherizing, 1345b
 Fleur-de-lis, 1346a, 1363a
 Fleury, 1346a
 Fleury, Simon, 1346a
 Flicker, 1346a, 3962a
 Floating Mines, 3467a
 Flint, 1346b
 Flint, 1346b
 Flint Glass, 1346a
 Flintlock 1346b
 Flooded Field, Battle of, 3224b
 Flood, 1346b
 Flood Plain, 1347b
 Flora, 1346a, 1347b
 Florence, A., 1348a
 Florence, Italy, 1348a
 Florentine School of Painting, 1348b
 Floriculture 1348b
 Florida, 1349a
 Florida Keys, 1352a
 Florin, 1352a
 Flotow, Friedrich von, 1351a
 Founder, 1351a
 Fount, 1351b
 Flowering Moss, 2976b
 Flowers, 1354a
 Flowers, Hidden Names, 1359
 Floyd, John Buchanan, 1358b
 Fluid, 1358b
 Fluorescence 1359a
 Fluorides, 1359b
 Fluorine, 1359b
 Fluorite, 1359b
 Fluor Spar, 1359b
 Flute, 1359b
 Fly, 1360a, 1309b, 1310a
 Flycatcher, 1361a
 Flying Buttress, 619a
 Flying Cat, 1365b
 Flying Dutchman, The, 1361a, 2794b
 Flying Fish, 1361a
 Flying Lizard, 1110b
 Flying Machine, 1361b, 1323a
 Flying Marmot, 1365b
 Flying Squirrel, 1365a
 Flywheel, 1365b
 Foch, Ferdinand, 1365b, 3824b
 Foe, 307b
 Fog, 1366a, 1469b
 Fokking, 1057b
 Folklore, 1366a
 Follow the Leader (game), 1439b
 Fomentation, 1366a
 Fond du Lac, Wis, 1366a
 Fontainebleau, France, 1366b
 Food, 1366b
 Food, Wise Selection of, 2834a
 Foodstuffs, 1056a
 Fools, Feast of, 1367b
 Foot (measure), 1368a
 Foot, The, 1368a
 Foot and Mouth Disease, 1368b
 Football, 1368b
 Football, Association, 254b

The letter a. after a number, indicates column 1; the letter b. column 2.

Foote, Andrew Hull, 1371b.
 Foote, Arthur, 1372a.
 Foote, Mary Mallock, 1372a.
 Foot Pound, 1372a, 3670b.
 Foot Rot, 1372a.
 Footminders, 1372a.
 Forbes-Robertson, Johnston, 1372b.
 Forbidden City, The, 2769a.
 Force, 1372b.
 Force Bills, 1373a.
 Forceps, 1372a.
 Force Pump, 2989b.
 Forcing House, 1380b.
 Ford, Henry, 1372a.
 Ford, Paul Leicester, 1372b.
 Foreclosure, 876a, 2418b.
 Foreign Commerce, 3688b.
 Foreign Phrases, 1372b.
 Foreordination, 1374b.
 Forehortening, 1375a.
 Foresters, Ancient Order of, 1376a.
 Foresters, Independent Order of, 1376a.
 Foresters of America, 1376a.
 Forest Reserves, 1379a.
 Forest Reserves in Canada, 1379a.
 Forestry Branch, 1379b.
 Forests and Forestry, 1375b.
 Forests of Canada, 564a.
 Forest Service, 1377b.
 Forgery, 1380a.
 Forest, Amadeus Emmanuel, 1380a.
 Forget-me-not, 1380a.
 Formaldehyde, 1380b.
 Formation, 372b.
 Formic Acid, 1380b.
 Formicarium, 132b.
 Formosa, 1380b.
 Forrest, Edwin, 1380b.
 Fort Collins, Colo., 1381a.
 Fort Dearborn, 1381a.
 Fort de France, 3621b.
 Fort Dodge, Iowa, 1381a.
 Fort Duquesne, 1381b.
 Fort, 2442a.
 Fort, 1381b.
 Fort Bridge, 1381b.
 Fort Henry and Fort Donelson, 1381b.
 Fort Howe Park, 2743a.
 Fortification, 1382a.
 Fortissimo, 3442a.
 Fort Madison, Ia., 1382b.
 Fort Mims, Massacre of, 1382a.
 Fort Moultrie, 1382a.
 Fort Niagara, 1382a.
 Fort Pitt, 3882b.
 Fortress Monroe, 1382a.
 Fort Scott, Kans., 1382b.
 Fort Smith, Ark., 1382b.
 Fort Sumter, 1382b.
 Fortuna, 1382a.
 Fort Wayne, Ind., 1382a.
 Fort William, Ont., 1382b.
 Fort Worth, Tex., 1382b, 3552b.
 Forty-two Articles, 3641b.
 Forum Romanorum, 1385a, 1385a.
 Fossil, 1385a, 1479a.
 Fossil-ox, 235b.
 Fossil Ore, 1387a.
 Fossil-paper, 229b.
 Foster, George Hulas, 1385b.
 Foster, Stephen Collins, 1385b.
 Fostoria, Ohio, 1386a.
 Foucault, Jean Bernard Leon, 1386a.
 Founding, 1386a.
 Fountain, 1386b.
 Fountain of Youth, 1386b.
 Four Books, 362a.
 Four O'clock, 1387a.
 Fourth of July, 1778b.
 Fowl, 1387a.
 Fox, 1387a.
 Fox, Charles James, 1388a.

Fox, George, 1388a, 2973a.
 Fox, John, Jr., 1388a.
 Fox and the Crow, The, 2022b.
 Foxglove, 1388a.
 Foxhound, 1388b.
 Fox Indians, 1387b.
 Foxtail Grass, 1388b.
 Fox Terrier, 1388b.
 Fox Trot, 1025b.
 Fraction, 1389a.
 Fraction Chart, 185b.
 Fra Diavolo, 1389a.
 Fram, The, 116b, 2468b, 3366b.
 France, 1389a.
 France, Anatole, 1389a.
 France, 1389b.
 Francesca da Rimini, 181a.
 Franchise, 1399a.
 Francis I (Holy Roman Emperor), 1399b.
 Francis II, 1399b.
 Franciscans, 1399b.
 Francis Joseph, 295b, 1399b.
 Francis of Assisi, Saint, 1400b.
 Francis, Cesar Auguste Jean Guillaume, 1400b.
 Franco-German War, 1400b, 3274a.
 Francois of Lorraine, 1593a.
 Francolin, 1401b.
 Franconia Mountains, 3866a.
 Frankfort, Ind., 1401b.
 Frankfort, Ky., 1401b.
 Frankfort - on the - Main, Germany, 1402a.
 Franking, 1402b.
 Frankland, 1402b.
 Franklin (Canada), 1402b.
 Franklin, Battle of, 1402b.
 Franklin, Benjamin, 1402a.
 Franklin, John, 1404a, 2605b.
 Franklin, Pa., 1404a.
 Franks, The, 1404a.
 Franz-Joseph Land, 1404b.
 Fraser River, 1404b.
 Fraternal Societies, 1404b.
 Fraternities, College, 1405a.
 Fraud, 1405b.
 Frau Holle, 2433a.
 Braunhofer, Joseph von, 1405b, 3380a.
 Frattannic Acid, 3512a.
 Frachette, Louis Honore, 1406a.
 Freckles, 1406a.
 Frederick, Md., 1406a.
 Frederick I (Prussia), 1406b.
 Frederick II (Prussia), 1406b.
 Frederick III (Prussia), 1407a.
 Frederick I, Barbarossa, 297b, 1407a.
 Frederick II (Stilly), 1407a.
 Frederick VIII, 1407b.
 Fredericksburg, Battle of, 1407b.
 Frederick the Great, 1405b, 2974a, 3913a.
 Frederick William, 1407b.
 Frederick William I, 1408a, 2956b.
 Frederick William III, 1408a.
 Frederick William IV, 1408a.
 Frederick William, Crown Prince, 3946a.
 Fredericton, N. B., 1408a.
 Frederickstad, Virgin Islands, 3620b.
 Free Cities, 1408b.
 Freedom's Bureau, 1408b.
 Free-Hand Drawing, 1117b.
 Freeholds, 1356a.
 Freeman, Mary E Wilkins, 1408b.
 Free Masonry, 2288b.
 Free Methodist Church, 1409a, 3412a.
 Freeport, Ill., 1409a.
 Free-soil Party, 1409a, 2987b.
 Free thinkers, 1409b.
 Free town, 1409b.

Free Trade, 1409b, 3615a.
 Free Will, 1410a.
 Freezing, 1410a, 2964b.
 Freezing Point, 3643b.
 Fremont, John Charles, 1410b.
 Fremont, Nebraska, 1410b.
 Fremont, Ohio, 1411a.
 Fremsted, Olive, 1411a.
 French, Alice, 1411a.
 French, Daniel Chester, 1411b, 3258a.
 French, John, 1411b, 3917b.
 French Academy, 11a.
 French and Indian War, 1412a.
 French Canadians, 2980b.
 French Chalk, 3508a.
 French Colonies, 384a.
 French Congo, 1412a.
 French Equatorial Africa, 313a, 1413a.
 French Guiana, 1413b.
 French Indo-China, 1414a.
 French Language, 1414a.
 French Literature, 2122b.
 French Revolution, 265b, 1414b.
 French Sculpture, 3344b.
 French Somaliland, 3344b.
 Frenchtown, Battle of, 3006a.
 French Universities, 3720b.
 French West Africa, 1417a.
 Fresco Painting, 1417a.
 Fresh-Water Polyp, 1744a.
 Fresno, Calif., 1417b.
 Frey, 1417b.
 Freya, 1417b.
 Friar, 2382b.
 Friction, 1418a.
 Friday, 1418a.
 Friendly Islands, 3593b.
 Friendly Societies, 1404b.
 Friese, 1238a.
 Frigate, 1418b.
 Frigate Bird, 1418b.
 Frigate, 1418a.
 Frobenius, Martin, 1418a.
 Froebel, Friedrich Wilhelm August, 1418a.
 Frog, 1419b.
 Frog and the Ox, The, 3422b.
 Frog Fish, 125a.
 Frog in the Middle (game), 1440b.
 Frohman (family), 1420a.
 Frohsart, Jean, 1420a.
 Frode, 1420b.
 Frontenac, Louis de Baude, 1420b.
 Frost, 1420b.
 Frost, Sarah Frances, 2255a.
 Frothbite, 1421a.
 Froude, James Anthony, 1421a.
 Frou-Frou, 1612b.
 Fruits, 1421b, 3684b.
 Frying (cooking), 1100a.
 Fu-chow, China, 1421b.
 Fuchsia, 1422a.
 Fuel, 1422a.
 Fugitive Slave Laws, 1422b.
 Fujiyama, 1422b, 3614b.
 Fulgurite, 1422b.
 Fuller, Margaret, 2937a.
 Fuller, Melville Weston, 1422a.
 Fuller's Earth, 1422a.
 Fulmar, 1422a.
 Fulmination, 1422b.
 Fulton, N. Y., 1422b.
 Fulton, Robert, 1422b, 1822a.
 Fumeroles, 366a.
 Fumigation, 1424a.
 Fundamental Orders of Connecticut, 3701b.
 Funday, Bay of, 1424a.
 Funeral March, 311a.
 Fung, 1050a, 1424a.
 Fungicides, 3606a.
 Funston, Frederick, 1424b.
 Fur and Fur Trade, 1425a, 3652a.
 Fur Farming, 1425a, 2940a.

Furies, 1426b
 Furlong, 1426b, 3844a.
 Furnace, 1426b
 Furness, Horace Howard,
 1427a
 Furrutree, 1427a
 Fur Seal, 2340b
 Fuse, 1427b
 Fuse Oil, 1426a
 Fusing Point, 1428a
 Fusion, 1428b
 Fust, Johann, 1808b

G

G, 1429a.
 Gabara, 1507a
 Gable, 1429a
 Gabriel, 1429a
 Gaddy, 1429a
 Gadsden, Ala., 1429b
 Gadsden Purchase, 1429b
 Gadsdill, 1073a
 Gadsdill, Johanna, 1429b
 Gadwall, 1429a, 1430a
 Gae, 1430a
 Gaele, 1429b
 Gage, 1429a
 Gage, Thomas, 1429a
 Gainesborough, Thomas, 1429b
 Galahad, Sir, 1429b, 3547a
 Galapagos Islands, 1429b
 Galatia, 1429b
 Galaxy, 2340a
 Galba, Servius Sulpicius,
 1431a
 Galen, 1431a
 Galena, 1431a
 Galena, Ill., 1431a
 Galenburgh, Ill., 1431b
 Galileo, 1421b
 Galileo, 1429a
 Galileo, Sea of, 1429b
 Galileo, 1429b, 1429a
 Gall, Franz Joseph, 1429a
 Gallatin, Albert, 1429a
 Gall Bladder, 1429b
 Galliey, 1429b
 Gall-Curcul, Amelita, 1429a
 Gallinule, 1429a
 Gallipoli, 1429a
 Gallium, 1429b
 Gallon, 1429b
 Gallows, 1429a
 Galle, 1429b
 Galop, 1029a
 Galworthy, John, 1429b
 Galt, Alexander Tilloch, 1429a
 Galt Out, 1429a
 Galton, Francis, 1429b
 Galvani, Luigi, 1429b
 Galvanic Battery, 1429a
 Galvanism, 1429a, 1429b
 Galvanized Iron, 1429b
 Galvanometer, 1429a
 Galveston, Tex., 1429a, 1429b
 Galveston Plan, 1429b
 Gama, Vasco Da, 1429b
 Gama, Grana, 1429b
 Gammal, 1429a
 Gambetta, Leon, 1429a
 Gambling, 1429a
 Game and Game Laws, 1429b
 Game Preserves, 1429a
 Game Reservations, 1429a
 Games, 1429b
 Games for Primary Teachers,
 1429a
 Gandhi, Mohandas K., 1429a
 Ganges, Ganges, 1429b
 Ganges River, 1429a
 Ganglion, 1429b
 Gangrene, 1429b
 Ganget, 1429b
 Ganymede, 1429b
 Gape, 1429a
 Gar, 1429a
 Garage, 1429a
 Garbage, 1429a

Garcia y Iniguez, Calixto,
 1429b
 Garda, Lake, 1429a
 Garden, Mary, 1429a
 Gardenia, 1429a
 Gardening, 1429b
 Garden of the Gods, 1429a
 Gardiner, Samuel Rawson,
 1429a
 Garfield, Harry Augustus,
 1429b, 1429a
 Garfield, James Abram, 1429b
 Garget, 1429b
 Gargle, 1429b
 Gargyle, 1429b
 Garibaldi, Giuseppe, 1429b
 Garland, Hamill, 1429a
 Garlic, 1429a
 Garner, John Nance, 1429b
 Garnet, 1429a, 1429b
 Garonne River, 1429b
 Garrick, David, 1429a
 Garrison, William Lloyd,
 1429a
 Garrotte, 1429a
 Garter, Order of the, 2671a
 Garter Snake, 1429b
 Gary, Elbert Henry, 1429b
 Gary, Ind., 1429b
 Gary School Plan, 1429a
 Gas, 1429a
 Gas, Illuminating, 1429a
 Gas, Natural, 1429b, 1429a
 Gas, Poison, 1429a
 Gascony, 1429a
 Gas Engine, 1429a, 1429a
 Gaskell, Elizabeth Cleghorn,
 1429b
 Gasoline, 1429b
 Gasoline Motor, 1429a
 Gaspar, 1429b
 Gas Tar, 1429b
 Gastric Juice, 1429a
 Gastritis, 1429a
 Gastropod, 1429b
 Gates, Horatio, 1429b
 Gath, 1429b
 Gattineau River, 1429b
 Gattineau, Richard Jordan,
 1429b, 1429a
 Gathing Gun, 1429a
 Gauge, 1429a
 Gaul, 1429a, 1429a
 Gauntlet, 1429b
 Gause, 1429b
 Gavia, 1429b
 Gavotte, 1429a
 Gawa River, 1429b
 Gay-Lussac, Louis Joseph,
 1429a
 Gaze, Syria, 1429a
 Gazelle, 1429a
 Gearing, 1429b
 Gecko, 1429b
 Gehenna, 1429b, 1429a
 Gehl, Emanuel, 1429a
 Geikie, Archibald, 1429a
 Geisler Tubes, 1429a, 1429a
 Gelatin, 1429b
 Gelatinoids, 1429b
 Gele, Clausen, 1429b
 Gelsamium, 1429b
 Gemara, 1429a
 Gemini, 1429b
 Gem of the Mountains, 1429a
 Gem, 1429b
 Gems, Artificial, 1429b
 Gendarmes, 1429a
 Genealogy, 1429a
 General (military), 1429b
 General Education Board,
 1429b
 General Grant National Park,
 1429a
 General Officers, 1429a
 General Staff, 1429b, 1429b
 Genesis, 1429b
 Genet, Edmon Charles Edou-
 ard, 1429a, 1429b
 Geneva, Lake, 1429a

Geneva, N.Y., 1429a
 Geneva, Switzerland, 1429b,
 1429b
 Geneva Arbitration, 1429b
 Geneva Convention, 1429b
 Genghis Khan, 1429a
 Genil, 1429a
 Gennesaret, Lake of, 1429b
 Genoa, 1429a
 Genre Painting, 1429b, 1429a
 Gentian, 1429b
 Gentiles, 1429a
 Genus, 1429a
 Geographical Mile, 1429b
 Geography, 1429a
 Geography, Methods of Teach-
 ing, 1429b
 Geological Survey of the Uni-
 ted States, 1429b
 Geology, 1429a
 Geometry, 1429a, 1429b
 George, David Lloyd, 1429a
 George, Henry, 1429b, 1429a
 George, Lake, 1429a
 George, Saint, 1429b
 George I (England), 1429a
 George I (Greece), 1429a
 George II (England), 1429a,
 1429b
 George III (England), 1429b
 George IV (England), 1429b
 George V (England), 1429b
 George Eliot, 1429a
 George Junior Republic, 1429a
 George Peabody College for
 Teachers, 1429b
 Georgetown, British Guiana,
 1429a
 Georgetown University, 1429a
 George Washington Univer-
 sity, The, 1429a
 Georgia, 1429b
 Georgia, (Isa.), 1429b
 Georgia, Strait of, 1429b
 Georgia, University of, 1429b
 Georgian Bay, 1429b
 Georgian Bay Ship Canal,
 1429a
 Georgia, 1429a, 1429b
 Germania, 1429a
 Gerard James Watson, 1429a
 Germania, 1429a
 German Colonies, 1429b
 German East Africa, 1429b
 German Language, 1429b
 German Literature, 1429a
 German Messias, 1429a
 German Sculpture, 1429a
 German Silver, 1429a, 1429b
 German Southwest Africa,
 1429b
 Germantown, Battle of, 1429b
 Germany, 1429a, 1429a, 1429a
 Germination, 1429a
 Germ, 1429a
 Germ Theory of Disease, 1429a
 Gerome, Jean Leon, 1429a
 Geronimo, 1429a
 Gerry, Elbridge, 1429a
 Gerryman, 1429a
 Gersheim, 1429a
 Gettysburg, Battle of, 1429b
 Gettysburg Address, 1429a
 Geyser, 1429b
 Geysers of Yellowstone, 1429b
 Giant Mountains, 1429b
 Gieberg, 1429a
 Ghent, Belgium, 1429a
 Ghent, Treaty of, 1429b, 1429a
 Gheto, 1429b
 Ghisla, Lorenzo, 1429b
 Ghost, 1429a
 Giant, 1429a
 Giant Cactus, 1429a
 Giants' Causeway, 1429b
 Gibbon, 1429a
 Gibbon Edward, 1429a
 Gibbons, James, 1429b
 Gibraltar, 1429a
 Gibraltar, Strait of, 1429b

The letter a, after a number, indicates column 1; the letter b, column 2.

Gibraltar of America, 2985a
 Gibraltar of the East, 24b
 Gibraltar of the West Indies, 2621b
 Gibson, Charles Dana, 1510b
 Gideon, 1510b
 Gideon's Band, 1510b
 Gifts the Dwarfs Made, The, 2489b
 Gila River, 1511a
 Gila Monster, 1511a
 Gilbert, Humphrey, 1511a
 Gilbert, William Schwenk, 1511a
 Gilding, 1511b
 Gilead, 1511b
 Gill, 1512a
 Gillett, Frederick Huntington, 1512a
 Gillette, William 1512a
 Gilman, Daniel Colt, 1512b
 Gilmore, Patrick S., 381a
 Gin 1512b
 Ginger, 1512b
 Gingham, 1512b
 Ginko, 1513a
 Ginseng, 1512a
 Giorgione, 1513a
 Giotto, 1512b
 Gipsy, 1502a
 Giraffe, 1512b
 Girard, Stephen, 1514a
 Girard College, 1514a
 Girasol, 1514b
 Girl Scouts, 1514b
 Girondists, 1514b
 Given Meridian, 2165a
 Gizzard, 1514b
 Glace Bay, N. S., 1514b
 Glacial Acetic Acid, 12a
 Glacial Period, 1514b
 Glacier, 1468a, 1512a
 Glacier National Park, 1515b, 2743a
 Gladiator, 1517a, 2377b
 Gladiolus, 1517b
 Gladstone, William Ewart, 1517b
 Glance, 1512a
 Gland, 1512b
 Glanders, 1512b
 Glasgow, Scotland, 1519a
 Glasgow, University of, 1520a
 Glass, 1520a, 2392a
 Glass Snake, 1522b
 Glauber's Salt, 1523a
 Glaxing, 2924b, 2925a
 Gleaners, The, 2707b
 Glenns Falls, N. Y., 1523a
 Gilding Joint, 1906b
 Globe, 1523a
 Globe, Ariz., 1523a
 Globe Amaranth, 107b
 Glorification, 146a
 Gloucester, Eng., 1523b
 Gloucester, Mass., 1523b
 Glove, 1523b
 Gloversville, N. Y., 1524a
 Glowworm, 1529b
 Gluonia, 1524a
 Gluck, Adam, 1524a
 Gluck, Christop Willibald, 1524b
 Glucose, 29a, 1524b
 Glue, 1525a
 Gluten, 1525a
 Glutton, 1525b
 Glycerine, 1525b
 Glycogen, 2143b
 Glyn, Milner, 1525b
 Gnat, 1525a
 Gneiss, 1526a
 Gnomes, 1292b, 1526a
 Gnu, 1526a
 Goat, 1526b
 Goat Island, 2565b
 Goatsucker, 1527a
 Gobelin Tapestry, 1512a
 Gobi, Desert of, 1527a
 God, 1527a

Goddess of Liberty, 2555b
 Goderich, Ont., 1527b
 Godfrey de Bouillon, 1527b
 Godiva, Lady, 1528a
 God Save the King, 1528a
 Godwin, Mary, 2276b
 Goethals, George Washington, 1528b, 2722b
 Goethe, Johann Wolfgang von, 1528b
 Goiter, 1529b
 Golconda, 1530a
 Gold, 1530a, 2385a, 2678a, 2973a
 Gold-beating, 1531a
 Gold Certificates, 2386a
 Gold Coast, 1531b
 Golden Age, 1532a
 Golden Bull, 1532a
 Golden Fleecce, 1532a
 Golden Gate, 1532a
 Golden Horn, 1532a
 Golden Lily, 2827a
 Golden Robin, 2382a
 Goldenrod, 1532b
 Golden State, The, 640a
 Golden-winged Woodpecker, 1346a, 2362a
 Goldfinch, 1532b
 Goldfish, 1532a
 Gold Lace, 1532a
 Goldboro, N. C., 1533a
 Goldschmidt, Madame Otto, 2116a
 Goldsmith, Oliver, 1533a
 Golf, 1533b
 Goliath, 417b, 1535a
 Gomez y Baer, Maximino, 1535a
 Gompers, Samuel, 1535a
 Gonzola, 1535b
 Gonzalvo de Cordova, Gonzalo Hernandez y Aguilera, 1535b
 Gooper, 2764a
 Good Feeling, Era of, 2708a
 Good Friday, 1536a
 Good Health (theme), 2559b
 Good Roads Movement, 2082a, 2682a
 Good Templars, Independent Order of, 1536a
 Good Will, 1536a
 Goodwin, Nathaniel Carl, 1536a
 Goodyear, Charles, 1536b, 1823a, 2127b
 Goose, 1536b
 Gooseberry, 1536b
 Goose-fish, 125a
 Goose Flesh, 2432a
 Goosefoot, 1537a
 Goose That Laid the Golden Egg, The, 2030a
 Gopher, 1537a
 Goramy, 1537a
 Gordian Knot, 1537a
 Gordon, Charles George 1537b
 Gordon, Charles William, 1537b
 Gorges, William Crawford, 1538a, 2722a
 Gorges, Fernando, 2227a
 Gorgons, 1538a, 2392a
 Gortia, 1538b
 Gorky, Maxim, 1539a
 Goshawk, 1539a
 Goshen, 1539a
 Goshen, Ind., 1539a
 Gensold, Bartholomew, 1539b
 Gospels, 1539b
 Gossamer, 1539b
 Gotham, 1539b
 Gothic Architecture, 156a
 Gothenburg, Sweden, 1540a
 Gotha, 1540a
 Gotterdammerung, 2795a
 Gough, John Bartholomew, 1540b
 Gould, George Jay, 1540b
 Gould, Helen Miller, 2277a
 Gould, Jay, 1540b

Gounod, Charles Francois 1541a
 Gourami, 1537a
 Gourd, 1541a
 Gout, 1541b
 Government, 1541b
 Government, Organization of the National, 2706b
 Government Annuities, 2652b
 Government Bonds, 498a
 Government of Canada, 567a
 Government of the United States, 2682b
 Governor (machinery), 1542b
 Governor-General, 1542b
 Governor's Island, 1542b
 Gracchus, 1542b
 Grace, Days of, 1542b
 Graces, 1542b
 Grackle, 1542a
 Grady, Henry Woodfin, 1542a
 Grafting, 1542a
 Graham Land, 1545a
 Grail, The Holy, 1545a
 Grain Elevator, 1545b
 Grains, 1545b
 Gram, 1546a, 2215b
 Grammar, 1546a, 2038b
 Gramophone, 2506a
 Gramplan Hills, 1546a
 Grampus, 1546b
 Granada (kingdom), 1546b
 Granada, Spain, 1546b
 Grand Army of the Republic, 1547a
 Grand Banks, 1332a, 1547a
 Grand Canyon of the Colorado, 1547a
 Grand Duchy, 1149a
 Grandfather's Clause, 1548a
 Grand Forks, N. D., 1548a
 Grand Island, Neb., 1548a
 Grand Junction, 1548b
 Grand Muff, 2275a
 Grand Pre, N. S., 1548a
 Grand Rapids, Mich., 1548b
 Grand Remonstrance, 1548b
 Grands Boulevards, 2727a
 Grand Trunk Railway, 2082a
 Grand Trunk Pacific Railway, 2003a
 Granite, 594b, 1549a
 Granite City, Illinois, 1549a
 Granite, The, 2629b
 Grant, Frederick Dent 1549b
 Grant, George Monroe, 1549b
 Grant, Robert, 1549b
 Grant, Ulysses Simpson, 538a, 825b, 1550a
 Granular Conjunctivitis, 1550b
 Granulation, 1550b
 Grape, 1550b
 Grapefruit, 1554a
 Graphite, 767b, 1554b
 Graphophone, 2506a
 Grasses, 1554b
 Grasshopper, 1555a, 2152a
 Gratz, 1555b
 Gravitation, 1555b
 Gravity, Center of, 729b
 Gravity, Specific, 1556a
 Gray, A., 1556b
 Gray, Elihu, 1556b
 Gray, George, 1557a
 Gray, Thomas, 1557a
 Gray Book, 477b
 Grayling, 1557a
 Gray's Harbor, Wash., 6b
 Graz, Hungary, 1556b
 Great American Desert, 2795b
 Great Bear Lake, 1557b
 Great Britain, 1557b
 Great Charter, 2218b
 Great Circle, 2382a
 Great Dane, 1558a
 Great Eastern, 627a, 1317b
 Great Expectations, 1072b
 Great Falls, Mont., 1558a
 Great Lakes, 1558b

Great Lakes Naval Training Station, 2484a
 Great Pedes River, 1866a
 Great Pyramid, 2973b
 Great Salt Lake, 1866a
 Great Seal of the United States, 1862a
 Great Slave Lake, 1866b
 Great Stone Face, The, 2530a, 3886b
 Great Wall of China, 1866b
 Great White Way, 2558a
 Great Yarmouth, Eng., 3960b
 Grebe, 1866b
 Grecian Mythology, 2443b
 Greece, 1867a
 Greece, in World War, 3920a
 Greek Architecture, 184a
 Greek Church, 1877b
 Greek Cross, 394a
 Greek Fire, 1878a
 Greek Language, 1878a
 Greek Literature, 212 a
 Greek Sculpture, 232 b
 Greeley, Cole, 1878b
 Greeley, Horace, 1878b
 Greeley, Adolphus Washington, 1879a
 Green (color), 1879a
 Green, Anna Katharine, 3092a
 Green, Eddy, 1879b
 Green, John Richard, 1879b
 Greenaway, Kate, 1879b
 Greenback Party, 1879b, 2890b
 Greenbacks, 1880a
 Green Bay Wis., 1880a
 Green Book, 477b
 Green Brier, 1880a
 Greene, Nathaniel, 1880b
 Greenhouse, 1880b
 Greenland, 1880b
 Green Mountain Boys, 1881a, 2672a
 Green Mountains, 1881a
 Green Mountain State, 2757a
 Green Racer, 486b
 Green River, 1881a
 Greensboro, N. C., 1881a
 Greensburg Pa., 1881b
 Greenville, Miss., 1881b
 Greenville, S. C., 1881b
 Greenville, Tex., 1881b
 Green Vitrul, 2467b
 Greenwich, Eng., 1882a
 Greenwich Observatory, 1882a
 Gregorian Calendar, 637b, 1882a
 Gregory (Pope), 1882a
 Grenada, 1882a
 Grenade, 1882a
 Grenadier, 1882a
 Grenfell, Wilfred Thomsen, 1882a
 Grenham's Law, 1882b
 Gretna Green, 1882b
 Grevy, Jules, 1882b
 Grey, Albert Henry George, 1882a
 Grey, Charles, 1882a
 Grey, Edward, 1882b
 Gray, Lady Jane, 1882b
 Grayhound, 1089b, 1882a
 Greylack Mountain, 22a
 Grieg, Edward Edgerup, 1882a
 Grimm, Jakob Ludwig, 1882a
 Grimm Wilhelm Karl, 1882a
 Grimm's Fairy Tales, 1882b
 Grindstone, 1882b
 Grippe, 1882a, 1882a, 1881a
 Grigoland (East and West), 1882a
 Gris-nex Cape, 1882a
 Growwell, 1882a
 Growshank, 1882a
 Grotius, Hugo, 1882b
 Ground Cuckoo, 3081a
 Ground Hog, 3082a
 Ground Ivy, 1882b, 1882b
 Ground Squirrel, 1882b
 Grouse, 1882b

Grub, 1882a
 Grunters, 1882b
 G S System, 3870b
 Guadalupe, Mex., 1882a
 Guadalupe River, 1882b
 Guadalupe Hidalgo, Treaty of, 1882b, 2323b
 Guadalupe Islands, 1882b
 Guadiana River, 1882a
 Guam, 1882a
 Guan, 1882b
 Guano, 1882b
 Guano, 1882b
 Guaraní, 3728b
 Guarantee, 1882a
 Guardian, 1882a
 Guassa, 1882a
 Guatemala (city), 1882b
 Guatemala (republic), 1882a
 Guava, 1882b
 Guayule Plant, 2127a
 Guayaquil, Ecuador, 1882a
 Gudgeon, 1882a
 Guelder Rose, 1882b, 3322b
 Guelp, Ont., 1882b
 Guelphs and Ghbellines, 1882b
 Guerín, Jules, 1882b
 Guernsey (Island), 1882a
 Guernsey Cattle, 1882a
 Guess Again (game), 1442a
 Guessing Contests, 1240b, 1243b
 Guevi, 127a
 Guido Reni, 1882a
 Guild, 1882a
 Guild, 1882b
 Guilford Court House, Battle of, 1882b
 Guillemin, 1882b
 Guilt Offering, 1152a
 Guinea (Africa), 1882a
 Guinea (corn), 1882b
 Guinea Fowl, 1882b
 Guinea Pig, 1882b
 Guiscard, Robert, 2470a
 Guise, 1882a
 Guise, Duke of, 1735b
 Guitar, 1882a
 Guiteau, Charles, 1447a
 Guizot, Francois Pierre Guilaume, 1882b
 Gulden, 1882b
 Gulf Stream, 1882b, 2630a
 Gulick Luther Halsey, 655b, 1882b
 Gull, 1882a
 Gullet, 2836a
 Gulliver's Travels, 1882b, 2482a
 Gum, 1882a
 Gum Arabic, 1882b
 Gumbo, 1882b
 Gumbolt, 1882b
 Gun, 1882b
 Gunboat, 1882a
 Guncock, 1882a
 Gun Metal, 570a
 Gunpowder, 1882a
 Gunpowder Plot, 1882b
 Gunther, 1882a
 Gurnard, 1882b
 Gustatory Nerve, 3519b
 Gustave V, 1882b
 Gustavus I, 1882a
 Gustavus II, Adolphus, 1882a, 3567a
 Gustavus III, 1882b
 Gustavus IV, Adolphus, 1882b
 Gustavus Vasa, 1882a
 Gutenberg, Johannes, 1882a, 2942a
 Guthrie, Okla., 1882a
 Gutta-percha, 1882b
 Gymnasia, 1882a
 Gymnasium, 1882a
 Gymnastics, 1882b

Gymnosperms, 517a, 1602b
 Gypsies, 1603a
 Gypsum, 1603a
 Gypsy Moth, 1603b, 3656b
 Gyro-Compass, 1604a
 Gyroscope, 1604b

H

H, 1806a
 Hankon VII, 1806a
 Harlequin, 1806a
 Habakkuk, 1806b
 Habebas Corpus, 1605b
 Habib Ullah Khan, 32b
 Habit, 1606a, 1950b, 2952a
 Hackberry, 1607a, 2617a
 Hackett, James Koteltas, 1607a
 Hackmatack, 3608a
 Haddock, 1607a
 Hades, 1807a, 1866a
 Haec, 1607a, 2442a
 Hadji, 2476b
 Hadley, Arthur Twining, 1807b
 Hadrian, 1807b
 Hadrian's Tomb, 1807b
 Haecal, Ernest, 1808a
 Haemoglobin, 1808a
 Haif, 1808a
 Hagar, 1808a
 Hagerstown Md., 1808a
 Hagfish, 1808a
 Haggal, 1808a
 Hagar, Henry Rider, 1808b
 Hagus, The, 1808b
 Hague Peace Conference, 2761a
 Hahnemann Samuel Christian, 1809a, 171a
 Haig, Douglas, 1809b, 2821b
 Haif, 1809b
 Hall Columbia, 1610a
 Halman, 1610a
 Hair, 1809a, 2442a
 Hair Dressing, 1610b
 Hair Dye, 1612b
 Hairless Dog, 1612b
 Hair Worm, 1612b
 Hail, 1612b
 Hakedate, 1612a
 Halcyon, 1612a
 Hale, Edward Everett, 1612a
 Hale, Nathan, 1612b
 Halekaka, 3615b
 Halley, Ludovic, 1612b
 Halktone, 1612a
 Haliburton, Thomas Chandler, 1612b
 Halbut, 1612b
 Halifax, Eng., 1612b
 Halifax, N. S., 1612a
 Halite, 3775b
 Hall, Asaph, 1612a
 Hall, Granville Stanley, 1612b
 Hallam, Henry, 1612b
 Halle, Germany, 1612a
 Halleck Fitz-Greene, 1612a
 Hallelujah, 1612a
 Hallet, Stephen H., 3612b
 Halley, Edmund, 1612b
 Halley's Comet, 377a
 Hall of Columns, 2260b
 Hall of Fame, 1612b
 Halloween, 1612a, 2633b
 Hallucination, 1612a
 Hale, 1612b
 Halogens, 1612b
 Hale, Frans, 1612a
 Ham (Bible), 1612a
 Ham (food), 1612a
 Hamadryas (animal), 310a
 Hamadryas (mythology), 3262b
 Haman, 424b, 1612a
 Hamburg Germany, 1612a
 Hamlicar Barca, 1612b

The letter a, after a number, indicates column 1; the letter b, column 2

- Hamilton, Alexander, 1618b,
 3621a
 Hamilton, Ohio, 1619a
 Hamilton, Ont., 1619b
 Hamlet, 1619b
 Hamlin, Hannibal, 1620a
 Hammer, 1620a
 Hammer, Throwing the, 274a,
 1620a
 Hammerfest, Norway, 1620a
 Hammerhead Shark, 1620b
 Hammond (family), 1620b
 Hammond, Ind., 1620b
 Hammurabi, 311a
 Hampden, John, 1621a
 Hampshire Grants, 3760b
 Hampton, Wade, 1621a
 Hampton Normal and Agri-
 cultural Institute, 1621b
 Hampton Roads Conference,
 1622a
 Hamster, 1622a
 Hancock, John, 1622a
 Hancock, Mich., 1622b
 Hancock, Winfield Scott,
 1622b
 Hand 1622b
 Handball, 1622b
 Handel, George Frederick,
 1622b
 Handicap, 1622b
 Hand Lead, 3349b
 Hand Organ 1740b
 Hangbarg, 328a
 Hang-chow, 1624a
 Hanging, 1624a
 Hanging Gardens of Babylon,
 1624a, 321a
 Hankow, China, 1624b
 Hanks, Nancy, 2109a
 Hanna, Marcus Alonzo, 1624b
 Hannibal, 1624b
 Hannibal, Mo., 1625b
 Hanoi, Indo-China, 1625b
 Hanover (province), 1625b
 Hanover, Germany, 1626a
 Hansaatic League, 1626a
 Hansel and Gretel, 1736b
 Hansen, Gerhard, 1626b
 Hanson, Ole, 3244a
 Hapsburg, House of, 298a,
 1626b
 Hara-kiri, 1627a
 Hardecantue, 1627a
 Hardening of the Arteries,
 3215b
 Hardhack 3385b
 Harding, Warren G., 1627a
 Hardness, 1627a
 Hardy, Thomas, 1627b
 Hare, 1627b
 Hare and the Tortoise, The,
 2022b
 Harebell, 654b
 Harebell, 1628a
 Harem, 1628a
 Hargreaves, James, 1628b,
 3386a
 Harlan, John Marshall, 1628b
 Harlequin, 1628b
 Harmonica, 1629a
 Harmonics, 1629a
 Harmonium, 1629a
 Harmony, 1629a, 2442a
 Harmony of the Spheres,
 1629b
 Hainsworth, Alfred Charles
 William, 2593a
 Harness, 1629b
 Harness Antelope, 137a
 Harold (England), 1230b
 Harold II (England), 1630a
 Harold (Norway), 1630b
 Harold III (Norway), 1630a
 Harp, 1630a
 Harper, William Rainey,
 1630b
 Harper's Ferry, W Va., 1630b
 Harpies, 1631a
 Harpoon, 1631a
 Harpy 1631a
 Harva en, Beatrice, 1631a
 Harrai Abyssinia, 10a
 Harrier, 2260a
 Harriman, Edward Henry,
 1631b
 Harris, Joel Chandler, 1631b
 Harris, William Torrey, 1632a
 Harrisburg, Pa., 1632a
 Harrison, Benjamin, 1632b
 Harrison, Benjamin (Presi-
 dent), 1632b
 Harrison, Francis Burton,
 1635b, 2819b
 Harrison, William Henry,
 1636a, 3584b
 Harrod, James, 1941a
 Harrow, 1637a
 Hart, Albert Bushnell, 1637a
 Harte, Francis Bret, 1637b
 Hartbeest 1638a
 Hartford, Conn., 1638a
 Hartford Convention, 1638b
 Harthacnut, 1627a
 Hartshorn, 113b, 1638b
 Harun-al-Rashid, 1638b
 Harvard, John, 1639b
 Harvard University, 1639a
 Harvester, The Modern, 3030b
 Harvest Fish, 3397a
 Harvest Fly, 319b
 Harvestman, 1017a
 Harvest Moon, 1639b
 Harvey, George, 1640a
 Harvey, William, 1640a
 Hars Mountains, 1640a
 Hasdrubal, 1640b
 Hasel, 1640b
 Hashishim, 253a
 Hastings, Battle of, 1819b,
 1640b
 Hastings, Nebr., 1640b
 Hastings, Warren, 1641a,
 1784a
 Hat, 1641a
 Hathaway, Anne, 3267b
 Hattiesburg, Miss., 1641b
 Haunchoes, 155a
 Hauptmann, Gerhart, 1641b
 Havana, Cuba, 1642a
 Haverlock, Henry, 1642b
 Haverhill, Mass., 1642b
 Havre, France, 1643a
 Hawaii, 1643a, 3617a
 Hawaii National Park, 1644b,
 2742a, 3613a
 Hawk, 1644b
 Hawk and Hen (game) 1440a
 Hawkeye State, The 1825a
 Hawking, 1295a
 Hawkins, Anthony Hope,
 1646a
 Hawksbill, 1646b
 Hawkweed, 1646b
 Hawthorn, 1646b
 Hawthorne, Julian, 1646b
 Hawthorne, Nathaniel, 1646b,
 3272a
 Hay, 1647b
 Hay, John, 1648a
 Haydn, Josef, 1648b
 Hayes, Rutherford Birchard,
 1649a
 Hay Fever 1652a
 Hayne, Robert Young, 1652a
 Hay-Fauncetote Treaty, 1652b
 Hays, Charles Melville, 1652b
 Haywood, William D 1653a
 Haze, 1653a
 Hazel, 1653b
 Hazen, William Babcock,
 1653b, 3300a
 Hazing, 1653b
 Hazleton, Pa. 1653b
 Headache, 1654a
 Headache Powders, 13a
 Health, 1654a
 Health, Bill of, 432a
 Health, Boards of, 1654b
 Health of the Child, 798a
 Health Thrift, 3574b
 Hearn, Lafcadio, 1654b
 Hearnst (family), 1654b
 Heart, 1655b
 Hearts (card game), 1656a
 Heart Spasm, 124b
 Heat, 1656b, 3553a
 Heat Unit of, 3670b
 Heath, 1657b
 Heath Family, 525a
 Heating and Ventilation,
 1658a
 Heat Prostration, 3473a
 Heaven, 1659b
 Heaves, 1659b
 Heavy Earth, 349a
 Heavy Spar, 349b
 Hebe, 1659b
 Hebert, Jacques Rene, 1659b
 Hebrew Language and Litera-
 ture, 1660a
 Hebrews, The Epistle to the,
 1660b
 Hebrides, 1661a
 Hebron, 1661a
 Hecht, 1661a
 Hecla, 1661a
 Hectograph, 944b
 Hecto, 1661b, 2458b
 Hecluba, 1661b
 Hedge Bindweed, 433b
 Hedgehog, 1661b
 Hedin, Sven Anders, 1662a
 Hedjaz, 164a, 1662a, 3649b
 Hegel, Georg Wilhelm Fried-
 rich, 1662a
 Hehrin, 1662b, 2375b
 Heidelberg, Germany, 1662b
 Heidelberg University, 1663a
 Height of Land, 662b, 2584b
 Heilprin, Angelo, 1663a
 Heimdall, 1663a
 Heine, Heinrich, 1663a
 Heir, 1663b
 Heir Apparent, 1663b
 Heir Presumptive, 1663b
 Heir, 1663b
 Hele, 1663b
 Helena, Ark., 1664a
 Helena, Mont., 1664a
 Helena of Montenegro, 3767b
 Helen of Troy, 1664a, 1763a,
 2458a, 2735b
 Helgoland, 1664b
 Helicon, 1664b
 Helicograph, 1664b, 3301a
 Helipolis, 1665a
 Helios, 1665b
 Helicost, 1664b
 Heliotrope (gem), 1665a
 Heliotrope (plant), 1665a
 Helium, 1665b
 Hell, 1666a
 Hellebore, 1666a
 Hellenica, 3365b
 Hellespont, 1025a
 Hell Gate, 1666a
 Hell Gate Bridge, 158a
 Helmet, 1666b
 Helmholtz, Hermann von,
 1666b
 Heloise, 6a
 Helote, 1666b
 Helsinki, 1667a
 Helsingsfors, Finland 1667a
 Helvelians, 1667a, 3499a
 Helms, Felicia Dorothea,
 1667a
 Hemalite, 1667b, 1837a
 Hemiptera, 1667b
 Hemisphere, 1667b
 Hemlock, 1667b, 1668a
 Hemorrhage, 1668a
 Hemp, 1668b
 Henderson, Ky. 1669a
 Hendricks, Thomas Andrews,
 1669b
 Hen Hawk, 1669b
 Henna, 1669b
 Hennessee, Louis, 1669b, 2348b
 Henry, Joseph, 3328a
 Henry, Patrick, 1673a

The letter a, after a number, indicates column 1; the letter b, column 2

- Henry I (England), 1670a
Henry II (England), 1670a
Henry III (England), 1670b
Henry IV (England), 1670b
Henry V (England), 1670b
Henry VI (England), 1671a
Henry VII (England), 1671a
Henry VIII (England), 1725b,
922b, 1671a, 3041a
Henry III (France), 1672a
Henry IV (France), 1672a
Henry III (Holy Roman Em-
peror), 1672a
Henry IV (Holy Roman Em-
peror), 1672a
Henry VI (Holy Roman Em-
peror), 1672a
Henry of Navarre, 1672a
Henry the Navigator, 1673b
Henschel, Georg, 1674a
Hentv, George Alfred, 1674a
Hepatica, 1674a
Hepatic Duct, 1453b
Hepburn, 1725a
Hesselwhite, George, 1427b
Heptameron, 2311b
Heptarchy, 1230a, 1674a
Hera 1912a
Heraldry, 1674a
Herbert, James, 1674b
Herbert, Johann Friedrich,
1674b
Herbert, Victor, 1675a
Herbicides 1675b
Herbivorous Animals, 1675b
Herbs, 1675a
Herculeum, 1675b, 2897a
Hercules 1675a
Hercules, Pillars of 1676b
Hercules Beetle, 1676b
Herring, 1247a, 1260b, 1677a
Hercules, 723b
Heretic 1677a
Hermulson, Bjarn, 3774b
Hermite, 1677b
Hermite, Crab, 1677a
Hermite, Mound, 1677a
Herne, James A., 1677b
Hernia, 1677b
Hera (mythology), 9a, 1678a
Herod Ascrippa I, 1678a
Herod Ascrippa, 1678a
Herod Antipas 1678b
Herodias 3175a
Herodotus, 1678b
Herod the Great, 1678a
Hera and Hero-worship,
705b
Hercin, 1678b
Heron 1678a
Herrera, Francesco, 1679a
Herrick Myron T, 1679b
Herring King 3266a
Herschel, William, 1680a
2502a
Hesperides, 1630b
Hesperides, 1260b, 3753a,
Hesse 1680b
Hessian Fly, 1681a
Hessians, 1681b
Hewlett, Maurice Henry, 1681b
Heyse, Paul, 1681b
Hesekiah, 1682a, 3306b, 3252a,
Hewthorn 1682a, 2025b
Hibben, John Grier 1682a
Hibbing Mann 1682a
Hibernation, 1682a
Hibernia 1682b
Hibernians, Ancient Order of,
1682b
Hibiscus 1682b
Hiccough 1682a
Hichens, Robert Smythe, 1683a,
Hickory 1683b
Hicks Elias, 2978a
Hicks Quakers, 2978a
Hicoria, 1683b
Hicoryphichia, 1683b
Higginson, Thomas Went-
worth, 1865a
High Church, 1235b
Highest Mountains, 2428a
High Frequency Currents,
1709a
Highland Piling, 1025b
High-holder, 1346b
High Point, N. C., 1685a
High Priest, 1685a
High School, 1685b
High School Technical, 3786a
Highway, 1685b
High Water, 3675a
Hill, 1685b
Hill, Ambrose Powell, 1687a
Hill, David Bennett, 1687a
Hill, David Jerne, 1687a
Hill, James Jerome, 1687b
Hill Rowland, 2546b, 2918b
Hills Newell Dwight, 1687b
Himalaya, 1688a
Himation, 1443b
Hinscks Francis 1688b
Hindenburg, Paul von Benken-
dorf, 1688b
Hindenburg Line, 2925a
Hindu-Kush Mountains 1689a
Hindus, 1760a,
Hindus, 182a
Hines, Walker D 3001b
Hinge Joint, 1906b
Hinnom, Valley of, 1456b
Hippocampus, 1689a
Hippocrates, 1689a
Hippodromus, 1689b
Hippomenes, 2456b
Hippopotamus, 1689b
Hiram (king of Tyre), 1690a
Hiroshima, Japan 1690a
Hiroshima, City, 1690a
Hispania, 1690b
Histology, 1690b
Historical Map, 2347b
History, 1690b
History, Methods of Teaching,
1695a
History of the United States,
3699b
Hitler, Adolf, 1702a,
Hitler, 1702a
Hoang-kong, 1701b
Hoang-ho River, 1702b
Hobart Tasmania 1703a
Hobbesa Meindert, 1703a
Hobbes, John Oliver,
1703a
Hobby Horse, 427b
Hoboken, N. J., 1703a,
Hobson, Richard Pearson
1703b
Hockey 1703b
Hobbs, Richard March, 1704b,
2546b
Hoe Robert 1823a
Hofmann, Heinrich 1704b
Hofmann, Josef, 1704b
Hofmann, 1704b
Hogarth, William, 1705a,
2705b
Hogchoker, 3342a
Hoghead, 1705b, 3344a
Hogwarts, 1705b
Hohenlinden, Battle of 2471a
Hohenstaufen, 1705b
Hohenzollern (family), 1705b,
2956a
Hobbs 3266a
Hobbs (family), 1706a
Holden, Edward Singleton,
1706a
Holding Corporations 8641b
Hole in the Ice (game), 1459b
Holiday, 1706b
Holland, 3512b
Holland, John Phillip, 1706b,
3466a
Holand, Joseph Gilbert, 1707a
Holand, Rich, 1707a
Holley, Marietta, 1707a,
Holly, 1707a
Hollyhook, 1707b
Holmes Elias Burton, 1707b
Holmes, Oliver Wendell, 1708a,
3024a
Holmes, Oliver Wendell, Jr.,
1708a
Holothuria, 3239a
Holstein-Friesian Cattle, 728a
Holy Alliance 1709a
Holy City, 1709a
Holy Cross, Mount of the,
3089a
Holy Family, 1709a
Holy Ghost, 1709b
Holy Grail, 513a, 1544a, 1546a
Holy Grail, Quest of the, 3b
Holy Land, 1710b
Hob of Holies, 3455b
Holoake, Mass, 1709b
Holy Roman Empire, 1709b,
1853a
Holyrood Palace, 1179b
Holy Sepulcher, Church of the,
1859a
Holy Spirit Plant, 1711a
Holy Water, 1711a
Holy Week, 1711a
Homage, 1711a
Home, Daniel D 3287a
Home Discipline 1975a
Homeopathy 1711a
Homer 1711b
Homer Louisa 1712a
Home Rule, 1712a, 1841b
Home Rule (India) 1733a
Homestead, 1713a
Homestead Laws 2012b
Homesteads in Canada, 2015a
Homesteads, some, 2760a
Homeland, 1713a
Homing Pigeon 711b, 2851b
Honduras, 1713b
Hone, 1714a
Honey, 1714a
Honey Badger 8010a
Honeybee, 373b
Honey Locust, 1714a
Honeyuckle, 1714b
Hong Kiang River, 3502b
Hong-kong, 1714b
Honolulu, Hawaii 1715a
Honor, Titles of 3536b
Hood, John Bell, 1715a
Hood, Mount, 1715a
Hood, Robin, 1715b
Hood Thoms, 1715a
Hooey River, 1732b
Hoochah, 2857b
Hooker, Joseph, 3715b
Hooker, Mount, 1715b
Hookworm, 1715b
Hookworm, 8646a
Hoover, Herbert Clark 2716a,
2935
Hop, 1716a
Hope, Anthony, 1846a
Hop, 1716a
Hopkins, Mark, 1718a
Hopkinsville Ky
1718b
Hougham, Wash, 1718b
Horace, 1718b
Horatius 1719a
Horsebound 1719a
Horizon, 1719a
Horizontal Bar 1599a,
Horn (musical instrument),
1719b
Horn (zoology) 1719b
Hornbeam, 1720a
Hornbill, 1720a
Horned Lizard 1720a
Horned Toad 1720b
Hornell, N. Y., 1720b
Hornet 1720b
Horns Up (game) 1442a
Horse, 255b, 1721a
Horse, 1721a
Horse-chestnut, 1721b

Horse Fair, 3741b.
 Horsefly, 1429a.
 Horse Latitudes, 1721b.
 Horse Mackerel, 3645a.
 Horse Power, 1722a.
 Horse Racing, 3953b.
 Horse-radii, 1722a.
 Horseshoe, 1722a.
 Horseshoe Crab, 1722b.
 Horsetail Rush, 1722b.
 Horseweed, 1345b.
 Horticulture, 1723a.
 Hosea, 1723a.
 Hosmer, Harriet, 1723b.
 Hospital, 1723b.
 Hospital Fever, 3663a.
 Hospital for the Insane, 1805a.
 Hostage, 1724a.
 Hotbed, 1724a.
 Hotchkiss, Benjamin Berkely, 1724b.
 Hotel, 1724b.
 Hotel de Ville, 1725a.
 Hot House, 1580b.
 Hot-pack Method, 683b.
 Hot Springs, 3562b, 3963b.
 Hot Springs, Ark., 1725a.
 Hot Springs Reservation, 2742a.
 Hottentots, 1725a.
 Houdon, Jean Antoine, 1725b.
 Hound, 1089b, 1725b.
 Hourglass, 1725b.
 Houseboat, 1726a.
 Houseleek, 1726a.
 House of Commons, 1560b.
 House of Commons (Canada), 2744b.
 House of Lords, 1560b.
 House of the Seven Gables, The, 1647a, 3172a.
 House of York, 3967b.
 House Snake, 2339b.
 Housing Problem, 1726a.
 Houston, Sam, 1726b, 3553a.
 Houston, Tex., 1727a, 3552a.
 Howard, Catharine, 1672a.
 How Baby Ray Got up in the Morning, 1963a.
 Howe, Elias, 1727a, 1823a, 3265a.
 Howe, Joseph, 1727b.
 Howe, Julia Ward, 1728a.
 Howe, William, 1728a.
 Howell, Clark, 1728a.
 Howells, William Dean, 1728b.
 Howitzer, 1729a.
 Howrah, India, 636b.
 Hubbard, Albert, 1729a.
 Huckleberry, 1729a.
 Huckleberry Finn, Adventures of, 848a.
 Hudson, Henry, 1729b.
 Hudson, N. Y., 1729b.
 Hudson Bay, 1729b.
 Hudson Bay Railroad, 1730a.
 Hudson River, 1730a.
 Hudson River Tunnel, 3646a.
 Hudson's Bay Company, 1730b.
 Huerta, Victoriano, 1731b, 2322a, 3884b.
 Hughes, Charles Evans, 1731b.
 Hughes, James Laughlin, 1732a.
 Hughes, Sam, 1732a.
 Hughes, Thomas, 1732b.
 Hugli River, 1732b.
 Hugo, Victor Marie, 1732b.
 Huguenots, 348a, 1733b.
 Hula Girl, 3618a.
 Hull, Eng., 1734a.
 Hull, Que., 1734a.
 Hull, William, 1734b.
 Hull House, 1734b.
 Humane Societies, 996b, 997a.
 Human Period, 44a.
 Humbert I, 1734b.
 Humboldt, Friedrich Heinrich Alexander, 1735a.
 Hume, David, 1735b.

Humerus, 3318a.
 Humidity, 1735b, 1749a.
 Humming Bird, 1736a.
 Humperdinck, Engelbert, 1736b.
 Humphreys, West H., 1775b.
 Hums, 1736b, 3339a.
 Hundred Years' War, 1736b.
 Hungary, 1737a.
 Hunger, 1738a.
 Hunkers, 343b, 2887b.
 Huns, 1738b.
 Hunt, Helen Fiske, 1864b.
 Hunt, James Henry Leigh, 1738b.
 Hunt, William Holman, 1739a.
 Hunt, William Morris, 1739a.
 Hunting, 1739a.
 Hunting Leopard, 763a.
 Huntington, Ind., 1739b.
 Huntington, W. Va., 1739b.
 Hunyady, Janos, 1740a.
 Hurdle Races, 273b.
 Hurdling, 1740a.
 Hurdy-gurdy, 1740a.
 Huron, Lake, 1740b.
 Huron Indians, 1740b.
 Hurricane, 1741a.
 Husband and Wife, 1741a.
 Huss, John, 1741b.
 Hussites, 1742a.
 Hutchinson, Anne, 1742b, 2276a.
 Hutchinson, Kan., 1742b.
 Hutchinson, Thomas, 1742b.
 Hutuktu, 2387a.
 Huxley, Thomas Henry, 1743a.
 Hyacinth, 1743a.
 Hyacinthus, 1743b.
 Hyaloid Membrane, 1287b.
 Hyatt, Anna Vaughn, 1898a.
 Hybrid, 603b, 1743b.
 Hyderabad, India, 1743b.
 Hydra (mythology), 1744a.
 Hydra, Fresh-water, 1744a.
 Hydrangea, 1744b.
 Hydrate of Chloral, 809a.
 Hydrates, 1744b.
 Hydraulic Cement, 735b.
 Hydraulic Engine, 1744b.
 Hydraulic Press, 1747a.
 Hydraulic Ram, 1745a.
 Hydraulics, 1745b.
 Hydroaeroplane, 1363b.
 Hydrocarbons, 1096b, 1745b, 1746b.
 Hydrochloric Acid, 1745b.
 Hydrocyanic Acid, 2957b.
 Hydrofluoric Acid, 1746a.
 Hydrogen, 1746a.
 Hydrogen Dioxide, 1746b.
 Hydrogen Sulphide, 3467b, 3468a.
 Hydrography, 1746b.
 Hydrometer, 1746b.
 Hydrophobia, 1747a.
 Hydrophyte, 1747a.
 Hydrostatic Press, 1747a.
 Hydrostatics, 1747b.
 Hydrosulphuric Acid, 3468a.
 Hydrotherapy, 1748a.
 Hydroxide, 1744b.
 Hydroxyl, 1744b.
 Hyena, 1748a.
 Hygeia, 1748b.
 Hygiene, 1748b.
 Hydrometer, 1749a.
 Hyksos Kings, 1190b, 1749a.
 Hymen, 1749a.
 Hymns, National, 1749b.
 Hymns and Hymn Tunes, 1749b.
 Hyoid Bone, 3317b, 3594a.
 Hypatia, 1751a.
 Hypergeometry, 2280a.
 Hyperion, 1751a.
 Hypermetria, 1751a.
 Hypnotism, 1751b.
 Hypodermic Injection, 1752a.
 Hypotenuse, 3633a.

Hypothesis, 1752a.
 Hypssop, 1752b.
 Hysteria, 1752b.

I

I, 1752a, 2682a.
 Iambic Meter, 2311b.
 Ibanez, Vincente Blasco, 1753a.
 Iberia, 1753a.
 Iberville, Pierre le Moyne, 1753a.
 Ibex, 1753b.
 Ibis, 1754a.
 Ibsen, Henrik, 1754a.
 Icarus, 1017b.
 Ice, 1754b.
 Iceberg, 1755a.
 Iceland, 1755b.
 Iceland Moss, 1755a.
 Iceland Spar, 1756b.
 Ice Plant, 1756b.
 Ice Yachting, 1756b.
 Ichneumon, 1757a.
 Ichneumon Flies, 1757a.
 Ichthyosaurus, 1757a.
 Iconoclasts, 1757b.
 Icterus, 1379b.
 Idaho, 1757b.
 Idaho, University of, 1761b.
 Ideal Feelings, 1306a.
 Idealism, 1761b.
 Ideas, Association of, 255b.
 Identity, The Law of, 3576a.
 Ides, 1761b.
 Idiocy, 1805b.
 Idiom, 1761b.
 Idiot, 1762a.
 Idle Thoughts of an Idle Fellow, 1885a.
 Idol, 1762a.
 Idolatry, 1762a.
 Idun (mythology), 1762a.
 Idyl, 1762a.
 Idylls of the King, 3124a.
 Icyasus, 3590b.
 Igloo, 1254a.
 Ignatius, Saint, 1762b.
 Igneous Rocks, 1474a, 1762b.
 Ignis Fatuus, 1762b.
 Ignorance, 1762b.
 Iguaçu, 1762b.
 Iguanodon, 1077a.
 Iguaçu Falls, 1763a.
 I Have a Rendezvous with Death, 3248a.
 Ildefonso, Treaty of, 2543b.
 Ile de Bourbon, 3053b.
 Ileum, 1822a.
 Iliad, 14a, 1711b, 1763a.
 Illman, 1763b.
 Illington, Margaret, 1763b.
 Illinois, 1764a.
 Illinois, University of, 1770a.
 Illinois and Michigan Canal, 1770a.
 Illinois Indians, 1770a.
 Illinois River, 1770b.
 Iliteracy, 1770b.
 Iollo, P. I., 1771a.
 Illum, 3639a.
 Il Trovatore, 1771a, 3755a.
 Image Worship, 1771b.
 Imagination, 783b, 1771b.
 Imago, 1807b.
 Imam, 2657a.
 Immaculate Conception, 2436b.
 Immigration and Emigration, 1773a, 3691b.
 Immoral Acts, 1259b.
 Immortality, 1774a.
 Immortelle, 1281a, 1774b.
 Immunity, 1774b.
 Impact Wheel, 3331b.
 Impeachment, 1774b.
 Imperator (ship), 3283b.
 Imperator (ship), 1775b.
 Imperial Buzel, 612a.
 Imperial City, The, 2758b.

Imperialism, 1775b
 Import Duties, 1011b
 Impressionist School of Painting, 1776a
 Impressionism, 1776a
 Imprisonment, 1776a
 Imprisonment for Debt, 1776a
 Impulse, 1259a, 1951a, 3373a
 Incandescent Light, 1203b
 Incas, 1776b, 2799b
 Inch Worms, 2257a
 Incisors, 5527a
 Inclined Plane, 1777a
 Income Tax, 1777a
 Incubator, 1778a
 Indemnity, 1778a
 Independence, Kan, 1773b
 Independence, Mo., 1773b
 Independence Day, 1773b
 Independence, 1773b
 Independent Treasury, 3623a
 Indeterminate Sentence, 1773a
 Index Expurgatorius, 1773a
 India, 1773b
 India Ink, 1785a
 Indiana, 1785b
 Indianapolis, Ind., 1783b
 Indian Architecture, 1783b
 Indiana University, 1783a
 Indian Chinkara, 1456b
 Indian Flg., 2937b
 Indian Hemp, 1091a
 Indian Johnseum, 1575a
 Indian Mallow, 1791a
 Indian Ocean, 1791a
 Indian Root, 3385a
 Indians American, 1791b
 Indian Summer, 1796a
 Indian Territory, 1796b
 Indian Turnip, 1660a
 India Rubber, 3166b
 Indicolite, 3802b
 Indigo, 1796b
 Indigo Bird, 1797a
 Indium, 1797a
 Indo-China, 1797a
 Indoor Baseball, 1797a
 Indris, 2034a
 Induction (logic), 1797b
 Induction, Electric, 1201b, 1797b
 Induction Coil, 1797b
 Inductive Method, 1798a
 Inductive Philosophy, 2323a
 Indulgence, 1798b
 Indurite, 3329a
 Indus River, 1798a
 Industrial Revolution, 1798a
 Industrial School, 1799b
 Industrial Workers of the World, 1799b, 3492b
 Industries in the U S, 3655a
 Inertia, 1799b
 Infant, 2355a
 Infantile Paralysis, 1600a
 Infant Mortality, 1600a
 Infantry, 225a, 1800b
 Infection, 1800b
 Inferior Conjunction, 317a
 Inflammatory Rheumatism, 3659b
 In Flanders Fields, 2199b
 Infection, 2049b
 Influenza, 785a, 1801a
 Infusoria, 1801a
 Ingelow Jean, 1801b
 Ingersoll, Ont., 1801b
 Ingersoll, Robert Green, 1801b
 Inheritance Tax, 1801b
 Inhibition, 3573b
 Initiative (Government), 1802a
 Initiative (psychology), 783b
 Injunction, 1802b
 Ink, 1802b
 Inkberry, 3832b
 Inland Revenue, 1810a
 In Loco Parentis, 2734b
 Inness, George, 1803a
 Innocent (Popes), 1803b

Innocents, Feast of Holy, 1804a
 Innominate Bones, 3318b
 Insults, 1254a
 Insulation, 1804a
 Inquest, 1804a
 Inquisition, The, 1804a
 Insane Asylum, 1805a
 Insanity, 1805b
 Insect, 1807a, 2487b, 2491b
 Insecticides, 1806a
 Insectivora, 1806b
 Insignia, 1810b
 Insolvency, 1812a
 Insomnia, 1812a
 Inspector-General, 225b
 Inspiration, 549b
 Instinct, 1812b, 1951a
 Institute of France, 1812b
 Instrumental Music, 1813a
 Insulator, 1201b, 1813a
 Insulin, 1069a, 1813b
 Insurance, 1813b
 Insurance Broker, 569a
 Intaglio, 1816b, 2931a, 3229b
 Intelligence, Animal, 1817b
 Intelligence, 1817b
 Intercolonial Railway, 3002b
 Interest (economics), 1034b
 1818a, 3724b, 3794a
 Interest (psychology), 1817b
 Interior, Dept. of the, 1818a
 Intersection, 1818b
 Interlaken, Switzerland, 1818b
 Intermexco, 1818b
 Internal Revenue, 1818b
 International Code of Signals, 3200a
 International Copyright, 945b
 International Date Line, 1819a
 Internationalism, 1820a
 International Law, 1820b, 3067a
 International News Service, 254b, 1855a
 International Peace Conference, 3761a
 International Relations, 1697b
 Internes, 1724a
 Internuncio, 2822a
 Interstate Commerce Act, 1821b
 Interstate Commerce Commission, 2801a
 Intestacy, 1822a
 Intestine, 1822a
 In Time's Swing, 2044b
 Intrados, 153a
 Invalides, Hotel des, 1822b, 2797b
 Invalid Pension Act, 2782a
 Invention, 1822b
 Invertebrates, 1823a
 Invincible Armada, 219a
 Involution, 1823b
 Io, 1823b
 Iodine, 1824a
 Iodoform, 1824a
 Iola, Kans, 1824a
 Ionia, 1824b
 Ionian Islands, 1824b
 Ionian Order, 895b
 I O U, 1824b
 Iowa, 1825a
 Iowa, University of, 1828a
 Iowa City, Ia., 1828b
 Iowa Indians, 1828b
 Iowa River, 1828b
 Iowa State College of Agriculture and Mechanic Arts, 1828b
 Ipecac, 1828b
 Ipecacuanha, 1828a
 Iphigenia, 1828a
 Iphigenia in Tauris, 1824b
 Iquique, Chile, 1828a
 Irade, 1829b
 Iran, 1829b
 Iranians, 1829b
 Iraq, 1829b

Irawadi River, 1829b
 Ireland, 1830a
 Ireland, John, 1835a
 Iridium, 1835b
 Iridosmine, 1835b
 Iris (mythology), 1835b
 Iris (plant), 1835b
 Irish Lord, 3229a
 Irish Moss, 1836a
 Irish Sea, 1836a
 Iritis, 1836a
 Irkutsk, Siberia, 1836b
 Iron, 1836b, 3574a, 3656b
 Iron Age, 1836a
 Iron Cross, 1839b
 Iron Crown of Lombardy, 762b, 1839b
 Iron Gate, 1839b
 Iron Mask, The Man with the, 1839b
 Iron Mountain, 1840a
 Iron Mountain, Mich., 1840a
 Iron Rust, 3147b
 Ironton, Ohio, 1840a
 Ironwood, 1720a, 1840a
 Ironwood, Mich., 1840b
 Irony, 1840b
 Iroquoian Indians, 1840b
 Iroquois Theatre Fire, 3557a
 Irawaddy River, 1829b
 Irrigation, 1841a
 Irrigation in Canada, 1843b
 Irving, Henry, 1845b
 Irving, Washington, 1846a
 Isaac, 406a, 1846b
 Isaacs Rufus Daniel, 3029b
 Isabella of Castile, 1846b, 3373b
 Isalah, 1846b
 Isabell River, 1846b
 Ishmael, 1846a
 Ishpeming, Mich., 1847a
 Isinglass, 1847a, 2324a
 Isle, 1847a
 Islam, 1847b
 Island, 1847b
 Island of Rhode Island, 3063b
 Isle of Man, 1847b
 Isle of Pines, 1848a
 Isles of the Blessed, 1847b
 Isle of Wight, 1848a
 Isle Royale, 1848a
 Isobario Lines, 1848a
 Isocrates, 1848b
 Isothermal Lines, 1848b
 Isaphan, Persia, 1848b
 Isaphan Rugs, 1848a
 Israel, Josef, 1849a
 Isthmian Games, 1849a
 Isthmus, 1849a, 3423b
 Italia Irredenta, 1850a
 Italian Language, 1849b
 Italian Literature, 2122b
 Italian Somaliland, 3444b
 Italy, 1849a
 Italy in the World War, 3920b
 Itasca, Lake, 1850a, 2364b
 Itch, 1850a
 Itch Mite, 1850a
 Ithaca, 1850a
 Itin, N Y, 1850b
 Ito, Hirobumi, 1850b
 Iturbide, Augustin de, 1857a
 Ivan the Terrible, 1857a, 3143b
 Ivory, 1857a
 Ivory Black, 492a
 Ivory Coast, 1857b
 Ivory Palm, 1858a
 Ivy, 1858a
 Ixion, 1858b
 Ixtacchuatl, Mount, 3310b

J

J, 1859a
 Jabiru, 1859a, 3428b
 Jacans, 1859a
 Jackal, 1859b
 Jackdaws, 1859b

- Jack-in-the-pulpit, 1860a.
 Jacksnipe, 2135a, 3331b.
 Jack-rabbit, 1823a.
 Jackson, Adray, 1860b.
 Jackson, Helen Fiske Hunt, 1864b.
 Jackson, Mich., 1864b.
 Jackson, Miss., 1864b.
 Jackson, Tenn., 1865a.
 Jackson, Thomas Jonathan, 1865a.
 Jacksonville, Fla., 1866a.
 Jacksonville, Ill., 1866a.
 Jackstones, 1866b.
 Jackstraws, 1866b.
 Jacob, 408a, 1865b, 2995b.
 Jacobins, 1105a, 1866b.
 Jacobites, 1867a.
 Jacquard, Joseph Marie, 1867a.
 Jacquard Loom, 3339b.
 Jade, 1867a, 2506a.
 Jaffa, Palestine, 1867a.
 Jagannatha, 1913a.
 Jaguar, 1867b.
 Jahn, Friedrich Ludwig, 1867b.
 Jail Fever, 3663b.
 Jaipur, 1868a.
 Jalap, 1868a.
 Jamaica, 1868b.
 Jamaica Pepper, 2853b.
 James I, 1869a.
 James II, 1869b.
 James, Edmund James, 1869b.
 James, Henry, 1870a.
 James, Saint (the Greater), 1870a.
 James, Saint (the Less), 1870b.
 James, William, 1870b.
 James Bay, 1870b.
 Jameson, Leander Starr, 1870b.
 James River, 1871a.
 Jamestown, N. Y., 1871a.
 Jamestown, Va., 1871a, 3701b.
 Jane Eyre, 570a.
 Janesville, Wis., 1871a.
 January, 1871b.
 Janus, 1872a.
 Japan, 1872b, 3612a.
 Japanese Art, 1876b.
 Japanned Leather, 2756a.
 Japanning, 1878a.
 Japan Stream, 1997a, 2630a.
 Japheth, 1878b.
 Japura, 1878b.
 Jardin des Plantes, 515b.
 Jardine, William M., 1878b.
 Jasmine, 1878b.
 Jason, 1879a.
 Jasper, 1879a.
 Jasper, William, 1879a.
 Jasper Park, 2743a.
 Jassy, Rumania, 1879a.
 Jaundice, 1879b.
 Java, 1879b.
 Jay, 1880a.
 Jay, John, 1880b.
 Jay Treaty, 1881a.
 Jeannette, The, 2606a.
 Jebel Errahm, 155b.
 Jefferson, Joseph, 1881a.
 Jefferson, Thomas, 1881b.
 Jefferson City, Mo., 1885b.
 Jeffersonville, Ind., 1885b.
 Jehoshaphat, 1886a.
 Jehovah, 1886a.
 Jehu, 1886a.
 Jejunum, 1822a.
 Jellicoe, John Rushworth, 1886a, 3923b.
 Jelly, 1886b.
 Jellyfish, 1886b.
 Jena, Battle of, 1886b.
 Jenghis Khan, 1460a.
 Jenner, Edward, 1886b.
 Jephthah, 1887a.
 Jerboa, 1887a.
 Jeremiah, 1887a.
 Jericho, 413b, 1887b.
 Jericho Rose, 1887b.
 Jeroboam, 1888a.
 Jerome, Jerome Klapka, 1888a.
 Jersey Cattle, 729a.
 Jersey City, N. J., 1888a.
 Jerusalem, 1888b., 1888a.
 Jessamine, 1878b.
 Jester, 1890b.
 Jesuits, 1890b.
 Jesus Christ, 1891b.
 Jesus, Lover of My Soul, 1750b.
 Jet, 1893a.
 Jetty, 1893a.
 Jewelry, 1893b.
 Jewish, 1894a.
 Jews, 1894a.
 Jew's-harp, 1896b.
 Jeyapore, India, 1868a.
 Jezebel, 419a, 1896b.
 Jigger, 1896b.
 Jimson Weed, 3447a.
 Jinrikisha, 1897a, 3612b.
 Joachim, Joseph, 1897a.
 Joannes Island, 2248a.
 Joan of Arc, 1897a, 3059b.
 Job, 1898a.
 Jochebed, 410a.
 Joffre, Joseph Jacques Cesaire, 1898a.
 Johannesburg, South Africa, 1898b.
 John, King, (England), 1899a.
 John, Knights of Saint, 1899b.
 John (Popes), 1899a.
 John, Saint, 1899b.
 John Bull, 1900a.
 John III Sobieski, 1899b.
 Johnny-jump-up, 3747b.
 John of Gaunt, Duke of Lancaster, 1900a.
 Johns Hopkins University, 1900a.
 Johnson, Andrew, 1775b, 1900b, 3544b.
 Johnson, Hiram Warren, 1904a, 3112b.
 Johnson, Richard Mentor, 1904a.
 Johnson, Samuel, 1904a.
 Johnson City, Tenn., 1904b.
 Johnston, Albert Sidney, 1905a.
 Johnston, Joseph Eggleston, 1905a.
 Johnston, Mary, 1905b.
 Johnstown, N. Y., 1905a.
 Johnstown, Pa., 1906a.
 John the Baptist, 1898b.
 Joint (anatomy), 1906a.
 Joint (geology), 1906b.
 Joint Stock Company, 1907a.
 Jokai, Maurus, 1907a.
 Joliba River, 2571b.
 Joliet, Ill., 1907a.
 Joliet, Louis, 1907a.
 Joly De Lothbiniere, Henri, Gustave, 1907b.
 Jonah, 1907b.
 Jonathan, 417a, 1907b.
 Jones, Edith Newbold, 3856b.
 Jones, John Paul, 1907b.
 Jonquil, 1908a, 2474a.
 Jonson, Ben, 1908a.
 Joplin, Mo., 1909a.
 Jordan, David Starr, 1909b.
 Jordan River, 1909a.
 Joseph (husband of Mary), 1910a.
 Joseph (son of Jacob), 1910a.
 Josephine, Marie Rose, 1910a, 2472a.
 Joseph of Arimathea, 1892b.
 Josephus, Flavius, 1910a.
 Joshua, 1910b.
 Josiah, 1910b.
 Journalism, School of, 1910b.
 Journal to Stella, 3435a.
 Jove (mythology), 1913b.
 Juan de Fuca Strait of, 1911a.
 Juan Fernandez Island, 1911a, 3085a, 3249b.
 Juarez, Benito Pablo, 1911b.
 Jubilee, Year of, 1911b.
 Judah, 1911b.
 Judaism, 1894a.
 Judas, 1912a.
 Judas Iscariot, 1911b.
 Judas Tree, 1912a.
 Jude, 1912a.
 Judea, 1912a.
 Judge, 1912a.
 Judge-Advocate-General, 226a.
 Judges, Book of, 1912b.
 Judgment (law), 1263a, 1912b, 2948a.
 Judgment (psychology), 1912b, 1263a.
 Judicial Department, 3694a.
 Judicial Department of Canada, 1912b.
 Judicial Oath, 2627b.
 Judson, Harry Pratt, 1913a.
 Jurgernaut, 1913a.
 Jugo-Slavia, 301b, 1913b.
 Jugo-Slavs, 2995a.
 Jugular Vein, 1914a.
 Jurgutha, 1914a, 3102a.
 Jujitsu, 1914b, 3945b.
 Jubbe, 1914a.
 Jujutsu, 1914b, 3948b.
 Julep, 1914b.
 Julian Calendar, 637b.
 Julian the Apostate, 1914b.
 Juliet and Romeo, 3106b.
 Julius (Popes), 1915a.
 July, 1915a.
 July, Column of, 1916a.
 July Revolution, 1916a.
 Jumping Bean, 1916a.
 Jumping Mouse, 1887a, 1916a.
 Junco, 1916a.
 June, 1916b.
 Juneau, Alaska, 1917a.
 Juneau, Solomon, 2343b.
 Juneberry, 1917a.
 June Bug, 1917a.
 Jungfrau, 1917a.
 Jungle Books, 1918a.
 Jungle Fowl, 1917b.
 Junior High School, 1868a.
 Juniper, 1917b.
 Junius Letters, The, 1917b.
 Juno, 1917b.
 Jupiter (plant), 1918a.
 Jupiter (mythology), 1918b.
 Jura Mountains, 1919a.
 Jurassic Period, 1919a.
 Jury and Trial by Jury, 1919b, 2945b.
 Justice (title), 1912a.
 Justice, Department of, 1920a.
 Justice of the Peace, 1920a.
 Justianian I, 1920a.
 Just-So-Stories, 1984a.
 Jute, 1920b.
 Jutes, 1921a.
 Jutland, 1921a.
 Juvenal, Decimus Junius Juvenalis, 1921a.
 Juvenile Court, 1921b.

K

The letter a, after a number, indicates column 1; the letter b, column 2.

Kalmia, 1922b
 Kalmucks, 1924a
 Kalsomine 618a
 Kamerun, Germany, 1924a
 Kamloops, B C 1924a
 Kamtchatka 1924b
 Kanaka, 1944b
 Kanawha River, 1924b
 Kandahar, Afghanistan 1924b
 Kane, Eliza Kent, 1925a
 Kangaroo, 1925a
 Kankakee III, 1925b
 Kansas Indians, 1923a
 Kansas, 1925b
 Kansas University of, 1930a
 Kansas City, Kan, 1930b
 Kansas City, Mo., 1930b
 Kansas-Nebraska Bill, 1931a
 Kansas River, 1931b
 Kant, Immanuel, 1931b
 Kaolin, 1932a
 Karakorum Mountains, 1932a
 Karl I, (Austria-Hungary), 753a
 Karlowitz, Peace of, 3652a
 Karlobad, Bohemia 705a
 Karlsruhe Germany 705a
 Karnak, Egypt, 3557a 3570a.
 Kashgar, Western 1932a
 Kashmir India, 1932b
 Kassel, 718a
 Katahdin, Mount, 1932b
 Kata-kana, 1875b
 Kates, Who are These, 1243a
 Katrina, Loch, 1932b
 Kattagat, 725b
 Katydid, 1933a
 Kaulbach, Wilhelm von, 1923a
 Kaunitz, Wenzel Anton Dom-
 inik 1933a
 Kaw Indians, 1933a
 Kayak, 1934b
 Kazan, Russia, 1933b
 Kearny, Philip, 1933b
 Kearsarge, The, 340b
 Keats, John 1933b
 Kedzie Mixture 1806a
 Keeley, Lemie, 1934a
 Keeley Cure, 1934a
 Keene, Laura, 1934a
 Keene, N H, 1924b
 Keewatin, 1934b
 Keller Helen Adams, 1934b
 Kellogg, Frank B., 1934b
 Kelp 1935a
 Kelvin, Wm. Thomson 1935a
 Kemal Mustapha, 1925a
 Kendall, Amos, 1935a
 Kenebec Mountains, Battle of,
 1935b
 Kenilworth, Eng, 1935b
 Kennan, George, 1935b
 Kennebec River, 1936a
 Kenneth (King), 3223b
 Kenora, Ont., 1936a
 Kenosha, Wis., 1936a
 Kent, James 1936a
 Kentucky, 1936b
 Kentucky, State University of,
 1941b
 Kentucky and Virginia Res-
 olutions, 1941b
 Kentucky Cardinal, 709b
 Keokuk, Iowa, 1942a
 Kepler, Johann, 1942a
 Kerensky, Alexander, 3245a
 Kerosene, 1942b
 Kerosene Emulsion, 1806a
 Kestrel, 1942b
 Ketchup, 1942b
 Kettledrum 1146a
 Kewanee, Ill., 1942a
 Key (music) 1943a
 Key, Francis Scott, 1943a,
 3407a
 Keystone, 158a
 Keystone State, 2775a
 Key West, Fla., 1943b
 Khaki 1945b
 Khamin, 1944a

Khan, 1944a
 Kharkov, Russia, 1944a
 Khartum, Egypt, 1944a
 Khedive, 1190a, 1944b
 Khiva, 1944b
 Khufu, 769a
 Khyber Pass, 1944b
 Kiao-Chau, China, 1944b,
 3919a
 Kikapoo Indians, 1945a
 Kicking Horse Pass, 72a, 561a
 Kidd, William 1945a
 Kidnapping, 1945a
 Kidney Pie, 1945a
 Kieft, William, 2560a
 Kiel, Germany 1945b
 Kiel Canal, 1945b
 Kiev Russia, 1946a
 Kilauea, 1643b, 1946b, 3618b
 Killmanjaro, 1946b
 Kilmarnock, Lakes of, 1946b
 Kilmear, 1946b
 Kilm, 1947a
 Kilogram, 1947a
 Kilogrammer 1947a
 Kilometer, 1947a
 Kilowatt, 1947a
 Kilmory, 1947a
 Kimberley, South Africa,
 1947a
 Kindergarten, 1947b
 Kindergarten Games, 1955a
 Kindergarten Gifts, 1954a
 Kinemaltes, 1951b
 Kinetics, 158a, 1225a, 3410b
 Kinetic Theory of Gases,
 1450b
 Kinetoscope, 1822a
 King, 1931b
 King Arthur 236b
 Kingbird, 1931b
 King, Charles South Land,
 2530b
 Kingfisher, 1932a
 King George's War, 1412b
 King James's Bible, 494b
 Kinglet, 1932b
 King-maker, 3607b
 King Philip, 1932b
 Kings, Books of, 1932b
 King's Counsel 1932b
 Kingsley Charles, 1932b
 King's Mountain, Battle of,
 1932a
 Kings of England, 1230b
 King's Spear, 252a
 Kingston, Jamaica 1933a
 Kingston, N Y, 1933a
 Kingston Ont., 1933b
 King William's War 1412a
 Kioien Mountains 3480b
 Kioto, Japan 1937b
 Kiowa Indians, 1937b
 Kipling, Rudyard, 1937b
 Kirghiz, 1944a
 Kishinev, Russia, 1944b
 Kitchen Cabinet, 1944b
 Kitchenar, Horatio Herbert,
 1944b
 Kitchenar Ont., 1935a
 Kitchen Mouldens 1935a
 Kite (bird), 1935b
 Kites, 1935b
 Kittiwake, 1935a
 Kjoien Mountains, 1260b
 Klamath, 1935a
 Kleptomaniacs 1935a
 Klondike 1935a
 Kneipp, Sebastian, 1935b
 Kneipp, Sebastian, 1935b
 Knickerbocker's History of
 New York, 1846a
 Knife, 1935b
 Knighthood, Orders of 1935b
 Knights Hospitallers of Saint
 John, 1935b
 Knights of Columbus 1935a
 Knights of Labor, 1935a
 Knights of Malta, 1935b
 Knights of Pythias, 1935a

Knights of Rhodes, 1899b
 Knights Templar, 3637a
 Knitting Machine 1935b
 Knobs, The 1937a
 Knockout Drops, 183b
 Knot, 1939a
 Knot (nautical), 1939a, 3342b
 Knotgrass 1939a
 Knowing, 2955b
 Know-Nothings 1939a, 2390a
 Knox, Henry, 1939a
 Knox, John, 1939a, 3042a
 Knox, Philander Chase, 1939b
 Knoxville Tenn, 1932a
 Koala, 1939a
 Kobe, Japan, 1939a
 Koch, Robert, 1939a
 Kochanska Marceline, 3250b
 Kodiak Island 1922a
 Koh-i-noor Diamond, 1070b
 1932b
 Koh-i-noor 1939b
 Kokomo, Ind., 1932b
 Kolchak, Admiral, 3138b
 3235a
 Kongfuts 912a
 Kongo, 912b
 Kongsberg, Germany, 1939a
 Koolhaas, 1939a
 Kootenay, 1939a
 Kootenay River, 1939b
 Koran 1939b
 Kordofan, 1894a
 Korea, 348a
 Kosciusko, Thaddeus, 1994a,
 3254a
 Kosuth, Louis, 1994a
 Kousin 1949b
 Kovno Poland 1949b
 Krefeld, Germany 1949b
 Kremlin, 1949b 2420b
 Kreutzer Sonata, The, 4592a
 Kronstadt, Russia, 1955a
 Kropotkin Peter, 1955a
 Kruger, Stephanus Johannes
 Paulus 1955b 3243b
 Krupp, Friedrich Alfred 1955b
 Kryptos, 1955b
 Krypton, 1955a
 Kubalik, Jan, 1955a
 Kubali Khan, 802b, 1142a,
 1955a
 Kudu, 1955a
 Kuga 1907a
 Ku-Klux Klan, 1956a, 3711b
 Kultur, 3914b
 Kuma's 1949b
 Kumquat, 1949b
 Kun, Bela, 1738a
 Kurdistan 1956b
 Kurile Islands 1956b
 Kuro Suwo, 1957a
 Kuskokwim River 1957a
 Kyanite 1957b
 Kyoto, 1957b

L

La, 1958a
 Labiata, 1958a
 Labolera, 2565b
 Labor, Department of 1958a
 Labor, Division of 1958b
 Labor Bureau 3667b
 Labor Day 1959a
 Labor Legislation 1959a
 Labor Organizations, 1959b
 Labrador, 2000a
 Labrador Current 2000b
 Labradorite, 1907b 2000b
 Labrador Tea 2000b
 Laburnum, 2000b
 Labyrinth, 2001a
 Lac, 1937b
 Lac (ear), 1163b
 Lac 2001a
 Lac (coin), 8001b
 Laccadive Islands, 2001b
 Lacc 2001b
 Lacedaemon, 3376b, 3377a

- Lace-winged Flies, 2001b.
 Lachine, 2002a.
 Lacrymal Glands, 1289a, 2002a.
 Lackawanna River, 2002a.
 Laconia, 2002a.
 Laconia, N. H., 2002a.
 Lacquer, 2002b.
 Lacrosse, 2002b.
 La Crosse, Wis., 2003b.
 Lacteals, 2003b.
 Lactic Acid, 2004a.
 Lactose, 2337b.
 Ladies of Hell, 3225b.
 Lading, Bill of, 432a.
 Ladoga, Lake, 2004a.
 Ladrone Islands, 2004a.
 Lady, 1151b.
 Ladybird, 379a, 2004a, 3183b.
 Ladysmith, 2004a.
 Lady's Slipper, 2004b.
 LaFarge, John, 2004b, 3398b.
 Lafayette, Ind., 2005a.
 Lafayette, Marquis de, 2005a.
 Lafayette National Park, 340a, 2742a.
 LaFollette, Robert Marion, 2006b.
 Lafontaine, Jean de, 2006b.
 Lafontaine, Louis Hypolite, 2006b.
 Lagerlof, Selma, 2007a.
 La Gioconda, 2704a.
 Lago d' Averno, 305b.
 Lago Maggiore, 2217b.
 Lagoon, 2007a.
 Lagthing, 2511a.
 La Guayra, Venezuela, 2007a.
 Lahore, India, 2007a.
 Laissez Faire, 2007b.
 Lak, 2001b.
 Lake, 2007b.
 Lake Agassiz, 2007b.
 Lake Charles, La., 2008a.
 Lake Dwellings, 2008a.
 Lake of the Woods, 2008b.
 Lake School, 2008b.
 Lakes-to-the-Gulf Waterway, 2355a.
 Lakh, 3134b.
 Lalla Rookh, 3259a.
 Lamalism, 2008b.
 Lamar, Lucius Quintus Cincinnatus, 2008b.
 Lamarck, Jean Baptiste Pierre, 2009a.
 Lamb, Charles, 2009a.
 Lamb Kill, 1924a.
 Lamentations, 2009b.
 Laminae, 372b.
 Lammergeier, 2009b.
 La Moyné, Jean Baptiste, 2543b.
 Lamp, 2010a.
 Lampblack, 2010a.
 Lamprey, 2010a.
 Lanai, 3617b.
 Lancaster, House of, 2010b, 3118b.
 Lancaster, Ohio, 2010b.
 Lancaster, Pa., 2010b.
 Lance, 2011a.
 Lancelot of the Lake, 2011a.
 Lancel Fish, 2011a.
 Lancelwood, 2011b.
 Land and Sea Breezes, 2011b.
 Land Crab, 2011b.
 Landis, Kenesaw Mountain, 2012a.
 Land Measurement, 2300b.
 Land Office, 2014a.
 Land of the Midnight Sun, 2508b.
 Land of the Rising Sun, 3612a.
 Land of Steady Habits, 318a.
 Land of the White Elephant, 3291b.
 Lander, Walter Savage, 2012a.
 Lands, Public, 2012a.
 Lands, Travels in Distant, 3612a.
 Landscape Gardening, 2015a.
 Landseer, Edwin, 2015b.
 Land's End, 2015b.
 Landsmaal, 2610b.
 Landsting, 1057b.
 Lanfranc, Archbishop, 2015b.
 Lang, Andrew, 2015b.
 Langland, William, 2016a.
 Langley, Samuel Pierpont, 361a, 2016a.
 Langtry, Mrs. Lillie, 2016a.
 Language, Universal, 3719b.
 Language and Grammar, 2016b.
 Language of Flowers, 1355a.
 Languages, Origin of, 2820b.
 Languages of the World, 2056b.
 Lanier, Sidney, 2057a.
 Lansdowne, Henry Charles Keith, 2057a.
 Lansing, Mich., 2057b.
 Lantarn Fish, 2057b.
 Lantarn Fly, 2057b.
 Laocoon, The, 3232b.
 Lao-tze, 912a.
 La Paz, Bolivia, 2058a.
 Lapis Lazuli, 2058a, 461a.
 Laplace, Pierre Simon, 2058b.
 Lapland, 2058b.
 La Plata, Argentine, 2058b.
 La Porte, Ind., 2059a.
 Lapwing, 2059a.
 Laramie, Wyo., 2059a.
 Larceny, 2059b.
 Larch, 2059b, 3508a.
 Lard, 2060a.
 Laredo, Tex., 2060a.
 Lares and Penates, 2060a.
 Lark, 2060b.
 Larkspur, 2060b.
 Larva Porsena, 3100b.
 Larva, 616a, 1907b, 2060b.
 Laryngitis, 2060b.
 Larynx, 641b, 2061a.
 La Salle, Ill., 2061b.
 La Salle, Rene-Robert Cavellier, 2061b.
 Lassa, Tibet, 2093b.
 Lassalle, Ferdinand, 2061b.
 Lassen Volcanic National Park, 2742b.
 Last Couple Out (game), 1441b.
 Last Days of Pompeii, 600b.
 Last Judgment, The, 2325a, 3314b.
 Last Supper, The, 3774a.
 Las Vegas, N. Mex., 2062a.
 Lateral Moraines, 2410a.
 Lateran, 2062a.
 Latex, 3126b.
 Lath, 2062a.
 Lathrop, Julia Clifford, 2062b.
 Latimer, Hugh, 2062b.
 Latin Cross, 994a.
 Latin Language, 2063a.
 Latin Literature, 2122a.
 Latitude, 2063b.
 Latium, 2063b.
 Latter Day Saints, Church of Jesus Christ, 2063b, 2413a.
 La Traviata, 1106a, 3755a.
 Latvia, 2063b.
 Law, William, 2063b.
 Laudanum, 2064a, 2664b.
 Lauder, Harry, 2064a.
 Laughing Gas, 2064b.
 Laughlin, James L., 2064b.
 Laureate, 2878b.
 Laurel, 2064b.
 Laurel, Miss., 2065a.
 Lawrence, Marquez, 2919a.
 Laurentian Mountains, 2065a.
 Laurer, Wilfrid, 2065a.
 Laurium, Mich., 2065b.
 Laut, Agnes Christina, 2066a.
 Lava, 2066a.
 Laval Montmorency, Francois Xavier de, 2066b.
 Laval University, 2066a.
 Lavender, 2066b.
 Law, 2066b.
 Law, Andrew Bonar, 2067b.
 Law, John, 2067b, 2365b.
 Law, Sumptuary, 3470a.
 Lawn Tennis, 2068a.
 Law of the Twelve Tables, 3100a, 3657a.
 Lawrence, James, 770b, 2068b.
 Lawrence, Kan., 2068a.
 Lawrence, Mass., 2069a.
 Law Schools, 2069b.
 Lawsuit, 2069b.
 Lawton, Henry Ware, 2069b.
 Lays of Ancient Rome, 1719a.
 Lazarus, 2069b.
 Lazurite, 2069a.
 Lead (metal), 2069b.
 Lead, Kindly Light, 2538a.
 Lead, Sounding, 2070a.
 Lead, S. D., 2070b.
 Lead Glance, 1431a.
 Lead Poisoning, 2070b.
 Leadville, Colo., 2070b.
 Leaf Insects, 2071a.
 Leaf Lard, 2060a.
 League, 2071a.
 League of Nations, 2478b.
 League to Enforce Peace, 2071a.
 Leander, 9a.
 Leap Year, 2071b.
 Learning, Formal Steps in, 2131a.
 Lease, 2071b.
 Leather, 2072a, 3637a.
 Leatherback Turtle, 2073a.
 Leatherstocking Tales, 340a.
 Leavenworth, Kan., 2073b.
 Leaves, 2073b, 2483a, 3627b.
 Lebanon, Mountains of, 2075a.
 Lebanon, Pa., 2075a.
 Lecky, William Edward Hartpole, 2075b.
 Lecompton Constitution, 2075b.
 Le Conte, Joseph, 2076a.
 Ledum, 2000b.
 Lady Jeassu, 11a.
 Lee, Ann, 3267a.
 Lee, Charles, 2076a.
 Lee, Henry, 2076b.
 Lee, Richard Henry, 2076b.
 Lee, Robert Edward, 2077a.
 Leech, 2077b.
 Leeds, Eng., 2078a.
 Leek, 2078a.
 Leeward Islands, 2078a.
 LeGallienne, Richard, 2078a.
 Legal Tender, 2385b, 3538a.
 Legate, 2078b, 2622a.
 Legend, 2078b.
 Legend of Sleepy Hollow, 1846a.
 Legerdemain, 2078b.
 Leghorn, Italy, 2079a.
 Legion, 2079a.
 Legion of Honor, 2079a.
 Legislative Assembly, 2079b.
 Legislative Department, 3693a.
 Legislature, 2079b.
 Leguminous Plants, 2080a.
 Leguminous, 2080b.
 Leigh River, 2080b.
 Leibnitz, Gottfried Wilhelm, 2080b.
 Leicester, Eng., 2080b.
 Leicester, Robert Dudley, 2081a.
 Leidy, Joseph, 2081a.
 Leif Ericson, 1250b.
 Leighton, Frederick, 2081a.
 Leipzig, Germany, 2081b.
 Leipzig, Battles of, 2081b.
 Leland Stanford Junior University, 2082a.
 Leman, Lake, 1453a.
 Lemberg, Galicia, 2082b.
 Lemming, 2082b.

The letter a, after a number, indicates column 1; the letter b, column 2

- Lemnos, 30a
 Le Moine, James MacPherson, 2082b
 Lemon, 2083a
 Lemur, 2083a
 Lena River, 2083b
 L'Enfant Pierre Charles, 3813a
 Length of Life, 2160a
 Lens, Nikolai, 492b, 2084a, 3139a, 3145b, 3638a
 Leningrad, 2084a
 Lemni-Lenape, 1052b
 Lenox, James, 2084a
 Lens, 2084b
 Lens France, 2085a
 Lent, 2085b
 Lentil, 2085b
 Leo (astronomy), 2085b
 Leo (Popes), 2085b
 Leo J., 2029b
 Leominster, Mass, 2086a
 Leon, Nicaragua, 2085b
 Leonardo da Vinci, 3773b
 Leonidas, 2086b, 2795a
 Leopard, 2086b, 3726b
 Leopold II, 2087a
 LePage, Eustien, 2706a
 Lepanto Gulf, of, 948b
 LePan, 1730a, 2753b
 Lepidus Marcus Aemilius, 285a, 2087a
 Leprosy, 2087a
 Lepta, 1110b
 Lesage, Alain Rene, 2087b
 Lesbos, 30a
 Les Huguenots, 2117a
 Les Miserables, 1732b, 2087b
 Lesseps, Ferdinand de, 2088a, 2720b, 3462a
 Leithbridge Alta, 2088a
 Leithe, 2088b
 Letter of Credit, 2088b
 Letter of Marque and Reprisal, 2256a, 2944b
 Letter Writing, 2088b
 Letts, 2089b
 Lettuce, 2089b
 Lettuce, Emanuel, 2089b
 Levant, 2089b, 3650b
 Leves, 2090a
 Level, 2090a
 Lever, 2090a
 Lever, Charles James, 2091a
 Leverwood, 1720a
 Leviathan (Biblical), 2091a
 Leviathan (ship), 3286a
 Lewis, Que, 2091b
 Levites, 2091b
 Leviticus, 2091b
 Lewis Meriwether, 2091b
 Lewis and Clark Expedition, 2092a
 Lewis and Clark Expo., 2092a
 Lewis Sinclair, 2092a
 Lewiston, Ida., 2092b
 Lewiston, Maine, 2092b
 Lexington, Battle of, 2092a
 Lexington, Ky., 2092b
 Leyden, Netherlands, 2092a
 Leyden Jar, 2092b
 Liase, Tibet, 2092b
 Lieo-tung Peninsula, 3143a
 Liban, Courland, 2092b
 Libel, 2094a, 3321a
 Liberal, 2094a, 3861a
 Liberal Republican Party, 2094b, 2885b
 Liberia, 2094b
 Liberty, Religious, 2044a
 Liberty, Sons of, 3145a
 Liberty, Statue of, 2095a
 Liberty Bell, 2095a
 Liberty Bonds, 2095a, 3933a
 Liberty Cap, 2095b
 Liberty Lotus, 2095a, 3933a
 Liberty of the Press, 2095b
 Liberty Party, 2095b, 2890b
 Library, 2095a
 Library of Congress, 2097a
 License, 2097a
 Lichens, 2097b
 Lichian Law, 3100a
 Lick, James, 2098a
 Lick Observatory, 2098a
 Licorice, 2098a
 Lictors, 2098a
 Liebig, Justus, 2098b
 Liebknecht, Karl, 1502b, 2098b, 3779b
 Liechtenstein, 2098b
 Liege, Belgium, 2099a
 Lien, Belgium, 2099a
 Lieutenant, 2099a
 Lieutenant-General, 2099b
 Lieutenant-Governor, 2099b
 Life, Length of, 2117b
 Lifeboat, 2100a
 Life Estate, 1256a
 Life Insurance, 1814b
 Life in the Desert, 157a
 Life of Samuel Johnson, 518a
 Life Preserver, 2100a
 Life-Saving Service, 866b, 2100a
 Life-Saving Gun and Rocket, 2100b
 Lift Pump, 2098b
 Ligament, 2100b
 Ligeret Hunter, 2100b
 Light, 2101a
 Light Polarization of, 2844b
 Lighthall, William Dover, 2102b
 Lighthouse, 2103b
 Lightning, 1467a, 2104b
 Lightning Rod, 2105b
 Lightship, 2104b
 Lignite, 362a, 2105b
 Li Hung Chang, Earl, 2105b
 Lilac, 2106a
 Liliaceae, 523a
 Liliuokalani, Lydia Kamehaha, 1045b, 2106a, 3619b
 Lille, France, 2106a
 Lily, 2106b
 Lily Family, 523a
 Lily of the Valley, 2106b
 Lima, Ohio, 2107a
 Lima, Peru, 2107a
 Lime (fruit), 2107a
 Lime (chemistry), 2107b
 Lime Light, 2107b
 Limerick, 2107b
 Limerick, Ireland, 2108a
 Limestone, 584b, 2108a
 Limited Monarchy, 2322a
 Limited Partnership, 2753a
 Limoges France, 2108b
 Limon, Costa Rica, 2108b
 Limonite, 2108b
 Limpet, 2108b
 Lincoln, Abraham, 2109a
 Lincoln, Eng, 2113b
 Lincoln, Ill., 2114a
 Lincoln, Neb., 2114a
 Lincoln Highway, 2114b
 Lind Jenny, 2115a
 Lindbergh, Charles A., 2115a
 Lindsey, Benjamin Barr, 2115b
 Line, 2115b
 Linen, 2115b
 Line, Pehr Henrik, 2116a
 Linguistics, 2116a
 Liniment, 2116a
 Linnaea, 2116a
 Linnaeus, 2116a
 Linne, Karl von, 2116a
 Linnet, 2116b
 Linoleum, 2116b
 Linotype, 2117a
 Linsseed, 2117a
 Linsseed Oil, 1344b, 2117b
 Linsseed Meal, 2117b
 Lion, 2117b
 Lion and the Mouse, The, 2023a
 Lion of Lucerne, 3118a
 Lipari Islands, 2118a
 Lippi Filippo, 2118a, 2703b
 Lip Reading, 2118b
 Lipton, Thomas, 2118b
 Liquid, 1747b, 2118a
 Liquid Air, 2119a
 Liquidambar, 2119a
 Liquid Fire, 2119a
 Liquid Measure, 2316b
 Liquors, 1082b
 Lira, 2119b
 Lisbon, Portugal, 2119b
 Lissagar, Lord, 2119b
 Lister, Joseph, 2120a, 2477a
 List, Franz, 2120a
 Litany, 2120a
 Litter, 2120a
 Literature, 2120b
 Literature, Boys and Girls in, 2120b
 Literature of Canada, 2129a
 Lithium, 2121a
 Lithography, 2121a
 Lithotomy, 2122a
 Lituania, 2122a
 Litmus, 2122a
 Little Chief Hare, 2852a
 Little Church Round the Corner, 2857b
 Little Dipper, 369a
 Little England, 3622a
 Little Falls, New York, 2142b
 Little Red Fauntleroy, 908a
 Little Men, 77a
 Little Pig that Wouldn't Go Over the Stile, The, 3424b
 Little Red Hen and the Grain of Wheat, 1950b
 Little Red Riding Hood, 2791a
 Little Rhody, 3061b
 Little Rock, Ark., 2142b
 Little Russians, 2145a
 Little Saint Bernard, 2158b
 Little Venice, 2780b
 Little Women, 77b
 Liturgy, 2148a
 Liu-Kiu, 2167a
 Live-forever, 1726a
 Liver, 2143a
 Livermore, Mary Ashton Rice, 2143b
 Liverpool, Eng, 2143b
 Liverwort, 2144a
 Live Stock, 3685a
 Livingston, David, 2144a, 3403b
 Livingston Robert R, 2178a
 Livius, 2145a
 Livonia, 2145a, 3074b
 Live, 2145a
 Livy, 2145a
 Lizard, 2145b
 Liama, 2146a
 Llano Estacado, 3549b
 Llanos, 2146a, 3852a
 Lloyd George, David, 1482a
 Lloyds, 2146b
 Loan, 2146b, 3339a
 Londa, Ampa, 165b
 Lony and Lobbying, 2146b
 Lobelia, 2146b
 Loblioli Pine, 2855b
 Lobster, 2146b
 Lobworm, 2147b
 Local Government, 3695a
 Local Option, 2147b
 Lochinvar, 2147b
 Lock, 2148a
 Lock (engineering), 2148b
 Locke, John, 2148b
 Lockhart, John Gibson, 2277b
 Lockjaw, 3548a
 Lockout, 2149a
 Lockport, N. Y., 2149a
 Lockwood, Belva Ann Bennett, 2149a
 Loco-Posos, 2149a
 Locomotive, 1829a, 2149a, 3421a
 Locomotor Ataxia, 2151b
 Loco Weed, 2151b
 Locust (insect), 2152b, 2752a
 Locust (tree), 2152b

The letter a, after a number, indicates column 1; the letter b, column 2

Lodge, Henry Cabot, 2152b.
 Lodz, Poland, 2152b.
 Loeb, Jacques, 2152b.
 Loess, 2153a.
 Lofoten Islands, 2153a.
 Log, 2153b.
 Logan, John A., 2153b, 2295b.
 Logan, Utah, 2154a.
 Loganberry, 2154a.
 Logansport, Ind., 2154a.
 Logarithms, 2154a.
 Loggerhead, 1646b.
 Logic, 2154a.
 Logwood, 2155a.
 Logengrin, 2155a.
 Loire, 2155a.
 Lok, 2155a, 2461b.
 Lollards, 2155b.
 Lombards, 2155b.
 Lombardy, 2155b.
 Lomond, Loch, 2156a.
 London, Eng., 2156a.
 London, Greater, 2156b.
 London, Jack, 2159a.
 London, Ont., 2159b.
 London, Tower of, 2160a.
 London Company, 2159b, 3701a, 3779b.
 Lone Star State, 3549a.
 Long Branch, N. J., 2159b.
 Longevity, 2160a.
 Longfellow, Henry Wadsworth, 2160b, 3015a, 3021b.
 Long Island, 2161a.
 Long Island, Battle of, 2161b.
 Longitude, 2161b.
 Longitude and Time, 2162a.
 Long Parliament, 2166b.
 Longstreet, James, 2166b.
 Loo-Choo, 2167a.
 Loon, 1084b.
 Loopers, 2237a.
 Loquat, 2167a.
 Lorain, Ohio, 2167a.
 Lord, 1151b, 2167b.
 Lord Chief Justice, 2167b.
 Lord Justice, 2162a.
 Lord Ullin's Daughter, 2042b.
 Lorelei, 2167b.
 Lorimer, George Horace, 2167b.
 Loris, 2167b.
 Lorraine, 103b.
 Lory, 2168a.
 Los Angeles, Calif., 2168a.
 Lossing, Benson John, 2169b.
 Lost Chord, The, 3466b.
 Lost River, 1488a.
 Lottery, 2169b.
 Lotus, 2169b.
 Lotus Eaters, 2170a.
 Loubet, Emile, 2170a.
 Louis I., 2170a.
 Louis IX, 999a, 2170b.
 Louis XI, 2170b.
 Louis XII, 2170b.
 Louis XIII, 2171a.
 Louis XIV, 2171a.
 Louis XV, 2171b, 2397a.
 Louis XVI, 2172a.
 Louis XVII, 2172b.
 Louis XVIII, 2172b.
 Louisburg, Sieges of, 2173a.
 Louis the German, 2172b.
 Louis the Pious, 709a, 752b.
 Louise, Lake, 2173a.
 Louisiana, 2173a.
 Louisiana Purchase, 2177b.
 Louisiana Purchase Exposition, 2178a.
 Louisiana State University, 2178b.
 Louis Philippe, 2178b.
 Louisville, Ky., 2178b.
 Louse, 2179b.
 Louvain, Belgium, 2180a.
 Louvre, The, 2180a.
 Love Apple, 3592b.
 Lovejoy, Elijah Parish, 2180b.
 Lover, Samuel, 2180b.

Low, Seth, 2180b.
 Low Church, 1235b.
 Lowell, Abbott Lawrence, 2181a.
 Lowell, James Russell, 2181a, 3024b.
 Lowell, Mass., 2182a.
 Lower California, 2182b.
 Lower Canada, 2984b.
 Low German, 2371b.
 Low Water, 3579a.
 Loyola, Ignatius, 2182b.
 Lubbock, John, 2183a.
 Lubeck, German, 2183a.
 Lucerne, Switzerland, 2183b.
 Lucerne, Lake, 2183b.
 Lu-Chu, 2167a.
 Lucia di Lammermoor, 1106a.
 Lucifer, 2183b, 3753a.
 Lucknow, British India, 2183b.
 Lucretia, 2184a.
 Ludendorff, Erich, 2184a.
 Ludington, Mich., 2184b.
 Ludlow Commission, 2721a.
 Lugbart, 2147b.
 Luzern, 2147b.
 Luke, Saint, 2184b.
 Lumbago, 2185a, 3060a.
 Lumber, 2185a.
 Lumbering in Canada, 665a.
 Lumber Jack, 1880b.
 Lumber Measurements, 2301a.
 Luminous Paint, 2701b.
 Lumpfish, 2187a.
 Lumpsucker, 2187a.
 Lumpy Jaw, 2187b.
 Luna, 2187b.
 Lunacy, 2187b.
 Lunar Caustic, 729b, 2187b.
 Lundy's Lane, Battle of, 2188a.
 Lungs, 2188a.
 Lungwort, 2188b.
 Lunula, 2466b.
 Lupercalia, 2188b.
 Lupine, 2189a.
 Lupus, 2189a.
 Luray Caverns, 2189a.
 Lusia, 2189a, 2383b, 3715a, 3924b.
 Lute, 2189b.
 Lutetia, 2739a.
 Luther, Martin, 2190a, 2632a.
 Lutherans, 2191a.
 Lutten, Battles of, 2191a.
 Luxembourg, 2191a.
 Luxembourg, Palace of, 2737b.
 Luxemburg, Rora, 1505b, 3377b.
 Luxor, Egypt, 2191a.
 Luzon, P. I., 2815a, 3617a.
 Lyceum, 2192a.
 Lyeurgus, 2192a.
 Lydia, 2192a.
 Lye, 139b.
 Lyell, Charles, 2192a.
 Lymph, 2192a.
 Lymphatics, 2192b.
 Lynchburg, Va., 2192b.
 Lynch Law, 2193a.
 Lynn, Mass., 2193a.
 Lynx, 2193a.
 Lyons, France, 2193b.
 Lyre, 2194a.
 Lyre Bird, 2194a.
 Lyric Poetry, 2194a.
 Lyxander, 2194b.
 Lysimachia, 2194b.
 Lysippus, 2195a.
 Lytton, Edward Robert Bulwer, 2195b.

M

M, 2196a.
 Maartens, Maarten, 2196a.
 Mable, Hamilton Wright, 2196a.
 Mac, 342b, 2467b.
 Macaroni, 2197a.

Macaulay, Thomas Babington, 2197a.
 Macaw, 2197b.
 Macbeth, 2197b.
 Maccapees, 2198a.
 Maccapees, Knights of the, 2198a.
 MacDonald, J. Ramsay, 2200a.
 Macdonald, John Alexander, 2200a.
 MacDowell, Edward A., 2201a.
 Mace (spice), 2201a.
 Mace (symbol of office), 2201a.
 Macedonia, 1744b, 2201a.
 Macgillivuddy's Reels, 1830b.
 Macgregor, Robert, 3085a.
 Machiavelli, Niccolo, 2202a.
 Machine, 2202b.
 Machine Gun, 2203a.
 Mackay (family), 2203b.
 Mackensen, Field Marshal von, 3922b.
 Mackenzie, 2204a.
 Mackenzie, Alexander (statesman), 2204a.
 Mackenzie, Alexander (explorer), 2204a.
 Mackenzie, William, 2204a.
 Mackenzie, William Lyon, 2204b.
 Mackenzie River, 2204b.
 Mackereel, 2205a.
 Mackinac Island, 2205a.
 MacMahon, Maria Edme Parfite, 2205b.
 MacMurrugh, Darnold, 1833a.
 Macon, Ga., 2205a.
 Madagascar, 2205a.
 Madame Buterfly, 2205b.
 Madame de Sael, 3397a.
 Madder, 2216a.
 Madeira Island, 2210a.
 Madeira River, 2210a.
 Madeleine, The, 2738a.
 Madero, Francisco, 2210b, 2225a, 3884b.
 Madison, Dolly, 2214a.
 Madison, James, 2210b.
 Madison, Wis., 2214a.
 Madonna, 2214b.
 Madras (province), 2215b.
 Madras, British India, 2215b.
 Madrid, Spain, 2216a.
 Madstrom, 2216b.
 Maeterlinck, Maurice, 2216b.
 Mafia, 2216b.
 Magdalen, Mary, 2217a.
 Magdalena River, 2217a.
 Magdalen Islands, 2217a.
 Magdeburg, Germany, 2217a.
 Magellan, Ferdinand, 2217b.
 Magellan, Strait of, 2217b.
 Maggore, Lake, 2217b.
 Magi, 2217b.
 Magic, 2217b.
 Magic Lantern, 2218a.
 Magic Music (game), 1441b.
 Magic Needle, 2219b.
 Magna Charta, 1899b, 2218b.
 Magnesia, 2218b.
 Magnesian Limestone, 1092b.
 Magnesium, 2218b.
 Magnet, 2219a.
 Magnetic Equator, 1248b, 2219a.
 Magnetic Field, 2219b.
 Magnetic Iron Ore, 2220a.
 Magnetic Needle, 2219b.
 Magnetic Poles, 2219b, 2885a.
 Magnetism, 1167b, 2219a.
 Magnetite, 2220a.
 Magneto-Electric Machine, 2220a.
 Magnificat, 2220a.
 Magnitude Relation, 2619b.
 Magnitudes of Stars, 3406b.
 Magnolia, 2220a.
 Magnolia State, 2260a.
 Maple, 533b, 2220b.
 Magyars, 2221a.
 Mahabharata, 2221a.

[illegible]

The letter a, after a number, indicates column 1; the letter b, column 2.

- Matanzas, Cuba, 2279a.
 Matches, 139b, 1823a, 2279a.
 Mate, 2279b.
 Mate (officer), 2279b.
 Material, Strength of, 3450a.
 Materialism, 2279b.
 Materia Medica, 2280a.
 Mathematical Geography, 1451b.
 Mathematics, 2280a.
 Mather, Cotton, 2281a, 3902b.
 Mather, Increase, 2281a.
 Matrix, 3661b.
 Matter, 2281a.
 Matterhorn, 2281b.
 Matthew, Saint, 2281b.
 Matthews, James Brander, 2281b.
 Mattoon, Ill., 2282a.
 Maumee River, 2282a.
 Mauna Kea, 1643b, 2282a, 3618a.
 Mauna Loa, 1643b, 2282a, 3618a.
 Maupassant, Henri Rene Albert Guy de, 2282a.
 Mauretania, 2283a.
 Mauritius Island, 2282b.
 Mausoleum, 2282b, 3592b.
 Mausolus, 2282b.
 Maxim (family), 3282b.
 Maximilian, 2283a, 2473b.
 Maximilian of Baden, 1502a.
 Maxwell, William Henry, 2283a.
 May, 2283a.
 Maya, 2284a.
 May Apple, 2236a, 2284a.
 May Beetle, 1917a.
 May Day, 2283b.
 Mayflower (vessel), 553a, 2284a, 2875b, 2876a, 3358a, 3403a.
 May Fly, 2284b.
 Mayhem, 2284b.
 Mayo, Charles Horace, 2284b.
 Mayo, Henry T., 3714b, 3584b.
 Mayo, William James, 2284b.
 Mayor, 2285a, 2434a.
 Maypop, 2754b.
 Mazarin, Jules, 2285a.
 Mazeppa, Ivan Stefanovitch, 2285b.
 Mazzini, Giuseppe, 2285b.
 McAdoo, William Gibbs, 2196a, 3001b.
 McAlester, Okla., 2196b.
 McBride, Richard, 2198a.
 McClellan, George Brinton, 2198b.
 McCarthy, Justin, 2198b.
 McClure, Samuel Sidney, 2199a.
 McCormack, John, 2199a.
 McCormick, C. H., 1823a, 2199a.
 McCrae, John, 2199a.
 McCutcheon, George Barr, 2199b.
 McCutcheon, John Tinney, 2200a.
 McDonough, Commodore, 3805b.
 McGee, Thomas D'Arcy, 2201b.
 McGill College and University, 2202a.
 McKeesport, Pa., 2203b.
 McKinley, Mount, 2205a.
 McKinley, William, 2205b, 2584a.
 McMaster, John Bach, 2208b.
 McMonnies, Frederick, 2208b, 2336a.
 Meade, George Gordon, 2286a.
 Meadow Lark, 2060b, 2286b.
 Meadowsweet, 3386b.
 Meadville, Pa., 2286b.
 Mealy Bug, 2286b.
 Measles, 784a, 2286b.
 Measures and Weights, 3843a.
 Measuring Worm, 2287a.
 Meat, 1098a, 2287a.
 Meat Packing, 2288a.
 Mecca, Hedjaz, 2289b.
 Mechanical Engineer, 1225b.
 Mechanical Powers, 2289b, 2290a.
 Mechanics, 2289b.
 Mechanicsville, Battle of, 2290a.
 Mechlin, Belgium, 2230a.
 Media Moraine, 2410a.
 Mecklenburg Declaration of Independence, 2290a.
 Mecklenburg-Schwerin, 2290b.
 Mecca, 2290b.
 Medford, Ore., 2290b.
 Medical Schools, 2290b.
 Medici, 2291a.
 Medici, Maria de, 1672b.
 Medicine, 2291a.
 Medicine Hat, Alberta, 2292a.
 Medicine Man, 3271a.
 Medieval and Modern History, 1694b.
 Medina, Hedjaz, 2292a.
 Mediterranean Sea, 2292b.
 Medulla Oblongata, 541b, 2292b.
 Medusa, 2293a, 2782a.
 Meerschaum, 2293a, 2857b.
 Megaphone, 2293a.
 Mehemet Ali, 1191a.
 Mehemet Shah, 2795b.
 Mehmet, 2376b.
 Melghen, Arthur, 2293a.
 Melissolier, Jean Louis Ernest, 2293b.
 Melstersingers, 2278a.
 Mekong River, 2293b.
 Melancholia, 1805b.
 Melancthon, Philip, 2293b, 3040b.
 Melanesia, 2632a.
 Melba, Nellie, 2293b.
 Melbourne, Australia, 2294a.
 Mellon, Andrew W., 2294a.
 Melbourne, William L., 2294a.
 Melchior, 2291b.
 Melilot, 2294b.
 Melodeon, 2678a.
 Melodrama, 2294b.
 Melon, 2294b.
 Melon Eaters, The, 2707a.
 Melon Tree, 2220b.
 Melos, 2294b.
 Melpomene, 2294b, 2438b.
 Melting Point, 2294b.
 Membranes, 2295a.
 Memling, Hans, 2295a, 2705a.
 Memnon, 2295a.
 Memorial Day, 2295b.
 Memorizing, Selections for, 2124a.
 Memory, 2295b.
 Memory, 2958b, 2962a.
 Memory Poems, 2026a.
 Memory Work, 2018a.
 Memphis, Egypt, 2297a.
 Memphis, Tenn., 2297a.
 Memphremagog Lake, 2297b.
 Men, Races of, 2994a.
 Mendelssohn-Bartholdy, Felix, 2297b.
 Mendicant Orders, 2297b.
 Mendoza, Argentina, 2298a.
 Menelaus, 2298a, 2458a.
 Menelek II, 10b.
 Menephthah, 1190b.
 Menhaden, 2298a.
 Meningitis, 2298a.
 Mennonites, The, 2298b.
 Menominee, Mich., 2298b.
 Menominee Indians, 2298b.
 Menstruum, 3343b.
 Mensuration, 2298b.
 Mental Activity, Phases of, 2958b.
 Mental Attitudes, 1262a.
 Mental Defectives, 1305b.
 Mental Powers, Development of the, 2767a, 2959b.
 Mentor, 2303a.
 Mephistopheles, 2303a.
 Mercantile Agency, 899a.
 Mercator's Projection, 2247b.
 Mercerized Cotton, 23a.
 Mercerizing, 2303b.
 Merchant Marine, 2303b.
 Merchant of Venice, 2304b.
 Mercier, Honore, 2304b.
 Mercury (metal), 344a, 767b, 2304b, 3563b.
 Mercury (mythology), 2305a, 2456b.
 Mercury (planet), 2305a.
 Mercury, Bichloride of, 365b.
 Mercy, Sisters of, 2305b.
 Mer de Glace, 103a, 1516a, 2305b.
 Meredith, George, 2306a.
 Merganser, 2306a.
 Mergenthaler, Ottmar, 2117a.
 Merida, Mexico, 2306a.
 Meriden, Conn., 2306a.
 Meridian, 2306b.
 Meridian, Miss, 2306b.
 Merimee, Prosper, 2306b.
 Merlin, 2306b.
 Mermaid and Merman, 2307a.
 Meropoe, 2872b.
 Merovingians, 2307a.
 Merrimac (ship), 838a.
 Merrimac River, 2307a.
 Mersey River, 2307a.
 Merthyr-Tydfil, Wales, 2307a.
 Merv, Oasis of, 2307b.
 Mesa, 2307b.
 Mesa Verde National Park, 2742b.
 Mesmer, Friedrich Anton, 2307b.
 Mesmerism, 2307b.
 Mesopotamia, 2308a.
 Mesozoic Era, 2308a.
 Mesquite, 2308a.
 Messenia, 2308a.
 Messiah, 2308a.
 Messiah, The, 1623b.
 Messina, Sicily, 2308b.
 Messina, Strait of, 2308b.
 Messines, Ridge, 3925a.
 Mestizos, 491a, 2319a, 2798a, 3748b.
 Meta (comet), 1982b.
 Metacarpals, 1623a.
 Metacarpus, 3318b.
 Metalloids, 2309b.
 Metallurgy, 2309b.
 Metals, 2309b.
 Metamorphic Rocks, 1474b, 2310a.
 Metamorphism, 2310a.
 Metamorphosis, 2310a.
 Metaphor, 1321a, 2310b.
 Metaphysics, 2310b.
 Metatarsus, 1368a, 3319a.
 Metaurus, Battle of, 1319b.
 Metempsychosis, 3508b.
 Meteor, 2310b.
 Meteorology, 2311a.
 Meter (unit measure), 2311b, 2315a.
 Meter (verse), 2311b.
 Methane, 2311b.
 Methodist Episcopal Church, 2312a, 3848b.
 Methodist Protestant Church, 2312a.
 Methodists, 2312a.
 Methods of Teaching, 2312b.
 Methyl Alcohol, 3907a.
 Methylated Spirit, 2314a.
 Metis, 2241a, 3200a.
 Metonymy, 2314b.
 Metric System, 2314b.
 Metronome, 2314b.
 Metropolitan Museum of Art, 2315b.
 Metternich, Clemens Wenzel, 2316b.
 Metz, Lorraine, France, 2317a.
 Meuse River, 2317a.

- Meyerbeer, Giacomo, 2317a
 Mexican War, The, 2317b,
 3709b
 Mexico, 2319a
 Mexico, Gulf of, 2323b
 Mexico City, 2323b
 Mexico-Rillievo, 1219b, 2324a
 Mesquit, 2324a
 Miami, Fla., 2324a
 Mica, 2324a
 Mica Schist, 2324b
 Michael, Saint, 2324b
 Michaelmas, 2324b
 Michelangelo Buonarroti,
 2324b, 2704b
 Michelet, Jules, 2325a
 Michelson Albert Abraham,
 2325b, 2577b
 Michigan, 2325b
 Michigan, Lake, 2321a
 Michigan, United States of, 2321b
 Michigan City, Ind., 2321b
 Microbe, 214a
 Microcline, 1307b
 Micrococcus, 214a
 Micrometer, 2322a
 Micronesia, 2322a, 2632a
 Microscope, 2322a
 Midas, 2323a
 Middle Ages, 2333a
 Middletown, Conn., 2333a
 Middletown, N. Y., 2333a
 Middletown, Ohio, 2333b
 Middling, 2333b
 Midianites, 2333b
 Midland, Ont., 2333b
 Midrash, 1600b
 Midshipman, 2333b
 Midsummer Night's Dream,
 2333b
 Mignonette, 2333b
 Migration of Animals, 2334a
 Migration of Birds, 456b, 457a,
 457b
 Mikado (title), 1377a, 2344b
 Mikado, The, 2311a, 3467a
 Milan, Italy, 2334b
 Milan Decree, 2335b
 Milkedews, 2335b
 Milk, 2335b
 Miles, Nelson Appleton, 2336a
 Miles City, Mont., 2336a
 Millets, 2336a
 Military Academy, United
 States, 2336a
 Military insignia, 1810b
 Military Schools, 2337a
 Military Training in High
 Schools is Desirable
 (theme), 3560b
 Milla, 234a, 2477b
 Milk, 234a, 2491a
 Milk Condensed, 2339a
 Milking Machine, 2339b
 Milk Snake, 2339b
 Milkweed, 2339b
 Milky Way, 2340a
 Mill, James, 2340a
 Mill, John Stuart, 2340a, 3729a
 Millard, John Everett, 2340b
 Millboard, 703a
 Millenium, 2340b
 Miller, Cincinnati Helms,
 2340b
 Miller, William, 23a
 Miller's Thumb, 2329a
 Millet, 2341a
 Millet Jean Francois, 2341a,
 2707b
 Mill on the Floss, 1213b
 Millikan, Robert A., 2341b
 Miller, Alfred, 2341b
 Milo, 2341b
 Milreis, 2341b
 Militaries, 2341a
 Milton John, 2342a
 Milwaukee Wis., 2342a
 Miyukof, Paul, 2145a
 Mniogeograph, 944b
 Mniogry, 2351a
 Mina Bird, 1544a
 Minaret, 2344a
 Minas Bay, 2344a, 3505a
 Mind, 2344a
 Mindanao, 2315b
 Mind and Body, Relation of,
 2375a
 Mind Reading, 2344b
 Mineral Piton, 463a
 Minerals and Mineralogy,
 2344b
 Mineral Springs, 2391b
 Mineral Waters, 2345a
 Minerva, 2445b
 Mine Sweeping, 2457a
 Minimum Wage, 2345b
 Mining, 2345a
 Minister Plenipotentiary,
 1245a
 Minister Resident, 2347a
 Ministry, 1500a, 2347a
 Mink, 2347a
 Minneapolis, Minn., 2347a
 Minnehaha, 2349a
 Minnesingers, 2349a
 Minnesota, 2349a
 Minnesota, University of
 2354b
 Minnesota River, 2355a
 Minnow, 2355a
 Minor, 2355a
 Minorca Island, 2355b
 Minor Coins, 2356a
 Minor Prophets, The, 2355b
 Minos, 2355b
 Minoctaur, 2355b, 3565a
 Minak, Russia, 2355b
 Ministrel, 2355b
 Mint, 2356a
 Mint (plant), 2356b
 Minto Gilbert John Murray,
 2356b
 Minuet, 1025a, 2356b
 Minuit, Peter, 2357b, 2560a
 Minus, 2357a
 Minutemen, 2357a
 Miocene Period, 2357a
 Mirabeau, Gabriel Honore Ri-
 quetti, 2357a
 Miracle, 2357b
 Miracle Play, 2357b
 Mirages, 1445b, 2357b
 Miramichi River, 2358a
 Mirror, 2358a
 Medemeanor, 2358a
 Misery, Mount, 2359b
 Misfeasance, 2359a
 Mishevaux, Ind., 2359a
 Mishna, 1660b, 3508a
 Missal, 2359a
 Missions and Missionaries,
 2359a
 Mississippi, 2360a
 Mississippi, University of,
 2364a
 Mississippi River, 2364a
 Mississippi Scheme, 2365b
 Missoula, Mont., 2365b
 Missouri, 2365b
 Missouri, University of, 2371a
 Missouri Compromise, 2371a
 Missouri Indians, 2371a
 Missouri-Mississippi System,
 2365b
 Missouri River, 2371b
 Mist, 1366a
 Mitelotes, 2307b, 2371b
 Mitchell, Donald Grant, 2372a
 Mitchell, John, 2372a
 Mitchell, Silas Weir, 2372b
 Mitchell S. D., 2372b
 Mites, 2372b
 Mithridates, 2372a
 Mittel Europa, 2319b
 Mispah, 2372a
 Mischken, 2372b
 Moabite Stone, 2372b
 Moberly, Mo., 2373b
 Mobile, Ala., 2373b
 Mobile Bay, Battle of, 2374a
 Mobile River, 2374b
 Moccasin Flower, 2004b
 Moccasin Snake, 2374b
 Mocking Bird, 2374b
 Modjeska, Helena, 2374b
 Modoc, 2375a
 Mogul, 2375a
 Mohair, 2375a
 Mohammed, 155b, 2375a
 Mohammed Ali, 2375a
 Mohammed II, 2322b
 Mohammed V, 2375b, 3653a
 Mohammed VI, 2363b
 Mohammedan Architecture,
 2375b
 Mohammedanism, 2376a
 Mohave Indians, 2376b
 Mohawk Indians, 2376a
 Mohawk River, 2376a
 Mohogian Indians, 2376a
 Mohogian Indians, 2376a
 Moki Indians, 1717b
 Molare, 2377a
 Molasses, 2378a
 Mold, 2378b
 Molding, 2378b
 Moie, 2378b
 Mole Cricket, 2378a
 Molecular Forces, 2379b
 Molecular Weights, 2379b
 Molecule, 2379a
 Mollers, Baptiste Poquelin,
 2379b
 Moline, Ill., 2380a
 Molinsca, 2380a
 Molokai, 2380b
 Molting, 1303b, 2380b
 Moltke (family), 2381a
 Molecules, The, 2381b
 Momentum, 2381b
 Mommsen Theodor, 2381b
 Momus, 2382a
 Monachism, 2382b
 Monaco Principality of, 2382a
 Mona Lisa, 2382a, 2774a
 Monarchy, 1542a, 2382a
 Monasticism, 2383b
 Monastir Serbia, 2383b
 Monck, Charles Stanley, 2383b
 Monck, George, 2383a
 Monerwort, 2194b
 Monoton, N. B., 2383b
 Monday, 2383b
 Money, 2384a
 Money in Canada, 2384a
 Money Order, 2386b
 Mongolia, 2387a
 Mongolia, 2387a, 2394b
 MongOOSE, 1757a, 2387b
 Monitor (animal), 2387b
 Monitor and Merrimac, 2388a,
 2388a
 Mont, 2388b
 Monk, George, 2388a
 Monkey, 2388b
 Monk's-hood, 14b
 Monmouth, Battle of, 2389a
 Monmouth, Ill., 2389a
 Monmouth, 2389a, 2389a
 Monobasic Acid, 14a
 Monocotyledons, 517a, 518b
 972b
 Monogamy, 2387a
 Monomania, 2389b
 Monongahela River, 2389b
 Monopoly, 1362a
 Monopoly, 2389b
 Monoral Suspended, 2390a
 Monothelism, 2390a
 Monotype, 2390a
 Monroe Doctrine, 2395a
 Monroe, James, 2390b
 Monroe, La., 2394b
 Monrovia, Liberia, 2395b
 Monsoon, 2396a
 Monsoon Current, 2396b
 Monstrousity, 2396a
 Montaigne, Michel Eyquem de
 2396a
 Montana, 2396b

- Montana, University of, 2400a
 Mont Blanc, 2400a
 Montcalm de Saint-Veran,
 Louis Joseph, 2400a
 Mont Cenis Tunnel, 736b
 Monte Carlo, 2382a
 Monte Cristo, 2400b
 Montenegro, 2400b
 Monterey, Battle of, 2401a
 Monterey, Mex., 2401a
 Monte Rosa, 2401a
 Montessori, Maria, 2401a
 Montessori Method, 2401b
 Montevideo, Uruguay, 2403b
 Montezuma 967a, 2403b
 Montfort, Simon de, 2404a
 Montgomery, Ala., 2404a
 Month, 2404b
 Monticello, 1385a, 2401b
 Montmorency, Falls of, 2986a
 Montpelier Vt., 2405a
 Montreal Que., 2405a
 Moody, Dwight Lyman, 2406b
 Moon, 266b 2407a
 Moon and Morning Stars
 (game), 2440a
 Moonflower, 2408a
 Moonshiners 2408a
 Moonstone, 461a 1307b, 2408b
 Moore, John, 2408b
 Moore, Thomas 2408b
 Moors, 2408a, 2917a
 Moose, 2409a
 Moosehead Lake, 2409b
 Moose Jaw, Sask. 2409b
 Moraine, 1816a 2410a
 Moral Acts 1259b
 Morality Plays 1115a, 2410a
 Morals Court, 2410a
 Moral Standards, 1261b
 Moral Training, 2455a
 Moratorium, 2410b
 Moravia, 2410b
 Moravian Brethren, 2410b
 Moriches, 1156b, 2411a
 Mordecai, 241a
 More Thomas, 2411a
 Morelia, Mexico, 2411b
 Morgan, Daniel, 2411b
 Morgan, Henry, 2411b
 Morgan, John Pierpont, 2412a
 Morgantic Marriage, 2257a
 Morgantown, N. Va., 2412b
 Morley, John, 2412b
 Mormons, 2412a, 3527b
 Mormon Temple, 2417b
 Morning-Glory, 2414a
 Morocco (capital of sulta-
 nate), 2414b
 Morocco (leather), 2415a
 Morocco (sultanate), 2414a
 Morpheus, 2415a
 Morphine, 139b, 2415a
 Morphology, 2415b
 Morrill, Justin Smith, 2415b
 Morris, Arthur J., 2415b
 Morris, Gouverneur (states-
 man), 2415b
 Morris, Gouverneur (writer),
 2415a
 Morris, Robert, 2416a
 Morris, William, 2416a
 Morris Plan Banks, 2416b
 Morristown, N. J., 2416b
 Morse, Samuel Finley Breese,
 1828a, 2417a, 3530b
 Mortality, Law of, 2417b
 Mortar, 2417b
 Mortar (weapon), 2417b
 Mortie D'Arthur, 2418a
 Mortgage, 2418a
 Mortgage Bonds, 497b
 Morton, Julius Sterling, 2419a,
 2495b
 Morton, Levi Parsons, 2419b
 Morton, William Thomas,
 2419b
 Mossa, 2419b, 3532b
 Moscow, Idaho, 2420a
 Moscow, Russia, 2420a
 Moselle River, 2421a
 Moses, 410a, 2421a
 Mosei-ca-tuni, 2770a
 Mosque, 2421a
 Mosque of Omar, 1883a, 3537b
 Mosquito, 2421a
 Mosquito Territory, 2422b
 Mosabunker, 2425a
 Mosses, 2423b
 Mosses from an Old Manse,
 1847a
 Moszkowski, Moritz, 2423a
 Moth, 2423a
 Mother Carey's Chickens,
 2804b
 Mother Goose, 2018a, 2423b
 Mother-of-Pearl, 2424a, 2764b
 Mother of Presidents, 3776b
 Mother's Day, 2424a
 Mother Shipton, 2424a
 Mother's Pensions, 2424b
 Motion, Laws of, 1169a
 Motions, Classification, 2748b
 Motley, John Lothrop, 2424b
 Motor Boat, 2424b
 Motorcycle, 2425a
 Motor Nerves, 2508b
 Mott, Lucretia Coffin, 2425b,
 3905b
 Moulken, 2431a
 Moultrie, William, 2425b
 Mound Bird, 2425b
 Mound Builders, 2426a
 Mountain, 1465a, 2426b
 Mountain Ash, 2427a
 Mountain Crabs, 2011b
 Mountain Laurel, 1923b
 Mountain-leather, 239b
 Mountain Lion, 2969a
 Mountain-wool, 239b
 Mount Carmel, Pa., 2427a
 Mount Desert Island, 2427a
 Mount McKinley National
 Park, 2742b
 Mount of Olives, 2654b
 Mount Ranier National Park,
 2742b
 Mounts (palmistry), 2716a
 Mount Stephen, Lord, 2427a
 Mount Vernon, Ill., 2427b
 Mount Vernon, N. Y., 2427b
 Mount Vernon, Ohio, 2428a
 Mount Vernon Va., 2427b
 Mourning, 2428a
 Mourning Dove, 2851b
 Mouse, 2428a
 Mouth, The, 2428a
 Moving Pictures, 2428b
 Moving Picture Theatre, 3557a
 Mozambique, 2918b
 Mozambique Channel, 2430a
 Mozambique Current, 2630a
 Mozart, Johann, 2430a
 Mucilage, 2430b
 Mucus, 2430b
 Mud Hen, 341b
 Mud Turtle, 3655b
 Muezzin, 2430b
 Mugwump, 2430b
 Murr, John, 2430b
 Murr Glacier, 2431a
 Mukden, Battle of, 2446b
 Mukden, Manchuria, 2431a
 Mulatto, 2431b, 2977a
 Mulberry, 2431b, 3308b
 Mule, 263a, 2432a
 Mule Killer, 3797b
 Mullien, 2432a
 Mullens, Eusebia, 976b, 2432a
 Muller, Friedrich Max, 2432a
 Mullet, 2432b
 Multigraph, 243a
 Multiples, Game of, 186b
 Multiplex Telegraph, 3530a
 Mumm, 2432b
 Mumps, 785a, 1819a, 2433a
 Munsie, 2433a
 Mundelein, George W., 2433a
 Mongoose, 2387b
 Munich, Germany, 2433b
 Municipal Government, 2433b
 Municipal Ownership, 2434b
 Munkacsy, Mihaly, 2434b
 Munro, Kirk, 2434b
 Munsee Indians, 2435a
 Munsey, Frank Andrew, 2435a
 Mural, Joachim, 2435a
 Muratore, Lucien, 2435b
 Murcia, Spain, 2435b
 Murder, 2435b
 Murfrees, Mary Noailles, 2436a
 Murfreesboro, Battle of, 2436a
 Muritic Acid, 1745b
 Murrillo, Bartolome Esteban,
 2436a
 Murray, Lindley, 2436b
 Murray Canal, 679a
 Murray River, 2436b
 Murrumbidgee River, 2437a
 Muscat, Oman, 2437a
 Muscatine, Iowa, 2437a
 Muscle, 2437a, 2842a
 Muscle Reading, 2444b
 Muscular Sense, 2437a, 2438a
 Muscle Shoals, 2438a
 Muscular Tissue, 2437a
 Muses, 2438a
 Museum, 2438b
 Mushrooms, 520b, 2439a
 Music, 2439b
 Musical Drama, 2664a
 Musk, 2443b
 Muskegon, Mich., 2443b
 Muskellunge, 2443b
 Muskogean Indians, 2443b
 Muskmelon, 2444a
 Muskogee, Okla., 2444a
 Muskoka Lake, 2444a
 Musk Ox, 2444b
 Muskrat, 2444b
 Muslin, 2445a
 Mussel, 2445a
 Mussel, Alfred de, 2445a
 Mussolini, Benito, 2446a
 Must, 2892b
 Mustard, 2446b
 Mustard Gas, 2881b
 Mustin, 2446b
 Mustin Act, 2446b
 Mutsuhito, 2446a
 Mutton, 2446a
 Muzaffar-ed-Din, 2795b
 Mycenae, 2446a
 Myopia, 2446b
 Myriapoda, 2446b
 Myron, 107b
 Myrrh, 2446b
 Myrtle, 2446b
 Mysore, India, 2447a
 Mysteries, 2447a
 Mystery, 2447a
 Mystery of Edwin Drood,
 1072b
 Mystery Plays, 1115a
 Mysticism, 2447b
 Mythology, 1478a, 2447b
 My Thought (game), 1442a
 Myxothallophytes, 516b

N

- N, 2466a
 Naaman, 420a
 Nabopolassar, 257a, 310b
 Naara, 2424a, 2764b
 Nadir, 2466a
 Nagana, 3642a
 Nagasaki, Japan, 2466a
 Nagoya, Japan, 2466a
 Nalada, 2466b, 2625b
 Nails (metal), 2466b
 Nails (of animals), 2466b
 Nasmyth James, 356a
 Names, Personal, 2467a
 Namur, Belgium, 2467b
 Nansimo, 346a
 Nans Sahib, 1784a, 2468a
 Nancy, France, 2468a
 Nandu, 3058b

- Nanking, China 2468a
 Nansen, Fridtjof, 2483b
 Nantes, Edict of, 2468a
 Nantes France, 2468a
 Nanticoke, Pa., 2469b
 Nantucket Island, 2469b
 Naoml, 424a
 Naples, Bay of, 2470a
 Naples, Italy, 2469b
 Naples, University of, 2470a
 Napoleon I, 2470b, 2461b
 Napoleon III, 2473a
 Naptha, 2473b
 Narcissus (mythology), 2474a
 Narcissus (plant), 2474a
 Narcotic, 2474b
 Nard, 2485a
 Narragansett Bay, 2474b
 Narragansett Indians, 2474b
 Narvaez, Panto de, 2474b
 Narwhal, 2474b
 Naseby, Battle of, 2475a
 Nashua, N. H., 2475a
 Nashville, Battle of, 2475a
 Nashville, Tenn., 2475b
 Nasmyth, James, 2476a, 2415b
 Nasmyth Hammer, 2415b
 Nast, Thomas, 2476a
 Nasturium, 2476a
 Natal, 2476b
 Natchez Miss, 2476b
 Natick, Mass, 2477a
 National Academy of Design, 2477a
 National Academy of Sciences, 2477a
 National Bank, 234a
 National Bank Notes, 2366a
 National Civic Federation, 2477a
 National Congress of Mothers, 2734b
 National Debt, 2477b
 National Education Association, 1133a
 National Flowers, 1355b
 National Guard, 2477b
 National Hymns, 2478b
 Nationalists, 2355b
 National Museum of the United States, 2478b
 National Republican Party, 2392b
 National Road, 1007b
 National Roads, 3093a
 National Transcontinental Railway, 3003a
 National Zoological Park, 2514a
 Nations, Law of, 1320b
 Nations, League of, 2478b
 Nations, Naming the, 1243a
 Native Bear, 1992a
 Nat Turner Insurrection, 3564b
 Natural (music), 2464a
 Natural Bridge, 2464a
 Natural Gas, 1452b, 3678a
 Natural History, 2464a
 Naturalism, 2464a
 Naturalization, 2464b
 Naturalization (botany), 12a
 Natural Monopoly, 2390a
 Natural Selection, 2465b
 Natural Theology, 2465b
 Nature Study, 2465a
 Nature Worship, 2462a
 Nausea, 2492b
 Nautical Almanac and American Ephemeris, 100b
 Nautilus, 2492b
 Navaho Indians, 2492b
 Naval Academy, United States, 2492b
 Naval Arsenal, 232b
 Naval Cadet, 233b
 Naval Militia, 2493b
 Naval Observatory, 2493b
 Naval Reserve, 2494a
 Naval Training Station, Great Lakes, 2494a
 Naval Uniforms, 2668a
 Navarre, 2494b
 Nave, 2494b
 Navigation, 2494b
 Navigation Acts, 2495a
 Navy, 2495b
 Navy, Department of the, 2497b
 Navy Yards, 232b, 1053a
 Nazarenes, 2497b
 Nazareth, 2497b
 Nazimova, Alla, 2497b
 Nebo, Mount, 2498a
 Nebraska, 2498a
 Nebraska, University of, 2502a
 Nebuchadnezzar, 310a, 421a, 2502a
 Nebula, 2502a
 Nebular Hypothesis, 1167b, 1477a, 2502a
 Necker, Jacques, 2502b
 Necromancy, 2502b
 Necropolis, 2503a
 Nectar, 2503a
 Nectarine, 2503a
 Needle, 2503a
 Negunee, Mich., 2503b
 Negligence, 2503b
 Negotiable Paper, 2503b
 Negrites, 2504a
 Negro, 2504a, 2994b
 Nagus, 10b, 2504b
 Nehemiah, 2504b
 Neighborhood Center, 902b
 Nelson, B. C., 2504b
 Nelson, Horatio, 2504b, 3621a
 Nelson River, 2505a
 Nelumbo, 2505a
 Nemesias, 2505b
 Nemesia, 2505b
 Neocene Epoch, 2505b
 Nepal, Kingdom of, 2505b
 Nephritis, 1867a, 2506a
 Nephritis, 2506a
 Nepona Lake, 2506b
 Neponset Lake, 2506b
 Nepos, Cornelius, 2506a
 Neptune (mythology), 2506a
 Neptune (planet), 2506b
 Nereids, 2506b, 2525b
 Nereus, 2506b
 Nernst Lamp, 1203b
 Nero, 2507a
 Nerva, 2507a
 Nerves, 2507a
 Nervous Diseases, 2508a
 Nervous System, 2508a
 Nest, 2511a
 Nestor, 2458a, 2512a
 Net, 2512a
 Netherlands, The, 2512b
 Nettie, 2517a
 Nettle Tree, 2517a
 Neuchatel, Lake of, 2517a
 Neuchatel, Switzerland, 2517a
 Neuralgia, 2507b, 2517b
 Neurasthenia, 2517b
 Neuritis, 2518a
 Neurons, 2507b, 2563a
 Neuroptera, 2518a
 Neurosis, 2518a
 Neurotic, 2518a
 Neuretic, 2518a
 Neva, 2518b
 Nevada, 2519a
 Nevada State University, 2521b
 Nevin Ethelbert, 2521b
 New Albany, Ind., 2521b
 Newark, N. J., 2522a
 Newark, Ohio, 2522b
 New Bedford, Mass., 2522b
 Newbern, N. C., 2523a
 New Britain, Conn., 2523a
 New Brunswick, 2523a
 New Brunswick, N. J., 2523b
 Newburgh N. Y., 2523a
 Newburyport, Mass., 2523a
 New Caledonia, 2523b
 Newcastle, Ind., 2523b
 Newcastle, New South Wales, 2523b
 Newcastle, Pa., 2523b
 Newcastle-upon-Tyne, Eng., 2523b
 Newcomb Simon, 2527a
 New England Confederation, 2527b
 Newfoundland, Dominion of, 2527b
 Newfoundland Dog, 2528b
 New Glasgow, N. S., 2528a
 New Guinea, 2528a
 New Hampshire, 2528b
 New Haven Conn., 2533a
 New Hebrides, 2533b
 New Jersey, 2534a
 New London, Conn., 2537b
 Newman, John Henry, 2537b, 2539b
 New Mexico, 2538a
 New Mexico, University of, 2538a
 New Moon, 2407b
 New Orleans, Battle of, 2543b
 New Orleans La., 2542a
 Newport, Ky., 2544a
 Newport, R. I., 2544b
 Newport News, Va., 2544b
 New Red Sandstone, 2545a
 New Rochelle N. Y., 2545a
 New South Wales, 2545a
 Newspaper, 2546b
 Newspaper Press, 2943a
 News, 2547b
 New Thought, 2547b
 Newton Isaac, 2547b
 New Westminster B. C., 2548a
 New Year's Day, 1571b, 2548a
 New York (city), 2548a
 New York (state), 2548b
 New York, College of the City of, 2561a
 New York, University of the State of, 2561a
 New York State Barge Canal, 1261a, 2561b
 New York University, 2562a
 New Zealand, Dominion of, 2562b
 Nez Perce, 2562a
 Niagara Falls, N. Y., 2562a
 Niagara Falls Ont., 2565b
 Niagara Falls and River, 2565b
 Niagara Suspension Bridge, 2590b
 Nibelungenlied, 2567a
 Nicaragua, 2567b
 Nicaragua, Lake, 2568a
 Nicaragua Canal, 2568b
 Nice, Councillors of, 2569a
 Nice, France, 2569a
 Niocene Creed, 2569b, 2569a
 Nicholas, Serbial, 2406b
 Nicholas, Saint, 2570a
 Nicholas I, 3143a
 Nicholas I Pavlovitch, 2569a
 Nicholas II, 2569b, 2570a
 Nicholas Meredith, 2570a
 Nicotia, 2570b
 Nickel, 2570b
 Nickel Sil, 1492a, 2570b
 Nicobar Islands, 2570b
 Nicolet, Jean, 2570a
 Nicotine, 139b, 2571a, 2571b
 Nielson, Alice, 2571a
 Niemen River, 2571a
 Nietzsche, Frederick, 2571a
 Nitzsche, 2571b
 Niger River, 2571b
 Nigeria, 2572a

The letter a, after a number, indicates column 1, the letter b, column 2.

Nigger-toe, 547b
 Night, 1466a
 Night-blooming Cereus, 741a
 Night Hawk, 2572a
 Night Heron, 2572a
 Nightingale, 2572b
 Nightingale, Florence, 2572b
 Nightjar, 1527a
 Nightmare, 2572a
 Night School, 1289a
 Nightshade, 2572a
 Nightshade Family, 523a
 Night Watch, The, 2546b
 Nihilists, 2572a
 Nijni-Novgorod, Russia, 2577a
 Nikalren, 123b
 Nike Apteros, Temple of, 2573b
 Nike of Samothrace, 2233a, 2233a
 Nile, 2573b
 Nilsson, Christine, 2574b
 Nimbus, 2574b
 Nimes, France, 2574b
 Nimrod, 2575a
 Nine Days' Queen, 1534b
 Nineveh, 2575a
 Ning-po, China, 2575a
 Niobe, 2575a
 Niobe and Her Children, 2233a
 Nipigon, Lake, 2575b
 Niplasing, Lake, 2575b
 Nippon, 2575b
 Nirvana, 528b
 Nisan, 2575b
 Nish, Serbia, 2575b
 Nismes, France, 2574b
 Nitrate of Silver, 2308b
 Nitrates, 2576a
 Nitre, 2173b
 Nitric Acid, 2576a
 Nitrogen, 2576b
 Nitroglycerine, 2576b
 Nitrous Oxide, 1059b
 Nix, 2577a
 Nixies, 1294a
 Nizam's Dominions, 1743b
 Nizhni-Novgorod, Russia, 2577a
 Noah, 2577a
 Nobel, Alfred Bernard, 2577b
 Nobel Prizes, 2577b
 Nobility, 2577b
 Noble Metal, 787b
 Nocturne, 2578a
 Node, 2578a
 Nogi, Ki-tou, 2578a
 Nomas Lake, 2578b
 Nome, Alaska, 2578b
 Nomen, 2467a
 Noncommissioned Officers, 227b, 2578b
 Nonconductors, 1201b
 Nonconformists, 2578a
 Nones, 2579a
 Non-Intercourse Act, 1218b
 Non-Metals, 2509b
 Non-Moral Acts, 1260a
 Nonnezoshi Bridge, 3736a
 Non-Partisan League, 2579a
 Nonsense Verses, 2022a
 Nordau, Max Simon, 2579a
 Norderkold, Nils Adolph Erik, 2579b
 Nordica, Lillian, 2579b
 Norfolk, Va., 2579b
 Noria, 2796b
 Normal School, 2580a
 Norman Architecture, 2580b
 Norman Conquest, 2575b
 Normandy, 2581a
 Normans, 2581a
 Norristown, Pa., 2581b
 Norsemen, 2602a
 Norse Mythology, 2462a
 North, Christopher, 2581b
 North, Frederick, 2581b
 North Adams, Mass., 2581b

North America, 1479b, 2582a
 Northampton, Mass., 2593a
 North Bay, Ont., 2593a
 North Cape, 2593b
 North Carolina, 2592b
 North Carolina, University of, 2593a
 North Carolina College of Agriculture and Engineering, 2593a
 Northcliffe, Lord, 2593a
 North Dakota, 2593b
 North Dakota, University of, 2601b
 Northeast Passage, 2605b
 Norther, 2601b
 Northern Lights, 287a, 1468b
 Northern Territory, 2601b
 North German Confederation, 2603a
 North Island, N. Z., 2563a
 Northmen, 2603a
 North Polar Exploration, 2603b
 Northrop, Cyrus, 2605b
 North Sea, 2608b
 North Star, 2607a, 2585b
 North Tonawanda, N. Y., 2607a
 Northwest Boundary, 2607a
 Northwestern Provinces and Oudh, 2671a
 Northwestern University, 2607a
 Northwest Passage, 2605b, 2607b, 2119b
 Northwest Territories, 2607b
 Northwest Territory, 2608a
 Norton, Charles Elliot, 2608a
 Norton, Lillian, 2579b
 Norway, 2608b
 Norwich, Conn., 2612a
 Norwich, Eng., 2612b
 Norwood, Ohio, 2612b
 Nox, 2612b
 Notary Public, 2612a
 Notation, 175b
 Notation (music), 2441a
 Note, Promissory, 2548b
 Notre Dame, Cathedral of, 2612a
 Notre Dame, University of, 2612a
 Nottingham, Eng., 2612b
 Notus, 51a
 Noun, 2048b, 2052a, 2612b
 Novaculita, 1714a, 2613b
 Nova Scotia, 2614a
 Nova Zembla, 2616b
 Novel, 2616b
 November, 2617b
 Novum Organum, 218b
 Noyes, Alfred, 2618a
 Noyes, John Humphrey, 2657b
 N-Hays, 2618b
 Nubia, 2618b
 Nuisance, 2618b
 Nullification, 2619a
 Numa Pompilius, 2619b
 Number, 174a
 Number, Methods of Teaching, 2619b
 Numbering Machine, 2621a
 Number-Match, 182a
 Number Work, 1978a
 Numbers, Book of, 2621a
 Numidia, 94a, 2621b
 Numismatics, 2621b
 Nummulate, 2622a
 Nun, 2622b, 2622a
 Nuncio, 2622a
 Nuns of Saint Ursula, 2722a
 Nuremberg, Germany, 2622a
 Nurse, 2622b
 Nursery, 2622a
 Nursery Rhymes, 2429b
 Nut, 2622b
 Nutrition, 2622b
 Nutcracker, 2622b
 Nuthatch, 2624a
 Nutmeg, 2624a

Nutrition, 2624b
 Nux Vomica, 139b, 2644b
 Nyassa, 2625a
 Nye, Edgar Wilson, 2625b
 Nymphs, 2625b

O

O, 2626a, 2626b
 Oahu Island, 1443a
 Oak, 2626a
 Oak Tree (theme), 2558a
 Oakland, Calif., 2627a
 Oakum, 2627b
 Oasis, 2627b
 Oath, 2627b
 Oats, 2628a
 Obelisk, 249a, 2628b
 Oberammergau, 2628b
 Oberlin College, 2628b
 Obesity, 2629a
 Obi River, 2629a
 Object Complement, 2048b
 Obos, 2629a
 Observatory, 2629b
 Obsidian, 2629a
 Ocarina, 2630a
 Ocean, 1479b, 1480b, 2631a
 Ocean Cable, 2632a
 Ocean Currents, 2630a
 Ocean Grove, N. J., 2632a
 Oceania, 2632a
 Oceanic Islands, 1847b
 Ocelot, 2632a
 Ochre, 2632b
 O'Connell, Daniel, 1834a, 2632b
 O'Connell, William H., 2632b
 O'Connor, Thomas Power, 2632a
 Octavia, 2632a
 Octavius, 2632a
 Octil, 2958b
 October, 2632a
 October's Bright Blue Weather, 2019b
 Octopus, 2634a
 Odd Fellows, Independent Order of, 2634b
 Ode, 2634b
 Odelsling, 2611a
 Oder River, 2635a
 Odessa, Ukraine, 2635a
 Odin, 2635b
 Odor, 2635a
 Odysses, 2635a, 2635b
 Odysey, 1711b, 2635b
 Oedipus, 2636a
 Oenone, 2785b
 Oesel Island, 2636a
 Oesophagus, 5b, 2636a
 Offenbach, Jacques, 2636a
 Ogden, Utah, 2636b
 Ogdenburg, N. Y., 2636b
 Ogilthorpe, James Edward, 2637a
 O Henry, 2090a
 Ohio, 2637a
 Ohio Company, 2643b
 Ohio River, 2643b
 Ohio State University, The, 2644a
 Ohm, 2644a
 Ohm, Georg Simon, 2644a
 Ohm's Law, 2644a
 Oil City, Pa., 2644b
 Oil Cloth, 2644b
 Oil Colors, 2702a
 Oil of Vitriol, 2468a
 Oil Palm, 2644b
 Oils, 2644b
 Ointment, 2645b
 Ojibwa Indians, 2645b
 Okapi, 2645b
 Okhotsk, Sea of, 2645b
 Oklahoma, 2645a
 Oklahoma, University of, 2645b
 Oklahoma City, Okla., 2651b
 Okra, 1682a, 2652a

Olcott, Henry S 2562a
 Old Age Pensions, 2552a
 Old Bay State, 2270b
 Old Bullion, 253a, 2566a
 Old Dominion, 2776b
 Oldenburg, 2652b
 Old Gaele's Lullaby, 2028a
 Oldham, Eng. 2652b
 Old Ironsides, 1708a
 Old Kentucky Home, 1285b
 Old Line State, 2262b
 Old-man Cereus, 741a
 Old Man Bloque, 22a
 Old Man of the Mountains,
 2530a, 2388a
 Old Point Comfort, Va. 2652b
 Old Pretender, The, 2452b
 Old Red Sandstone, 2652a
 Old Rough and Ready, 2523b
 Old South Meeting House,
 2653a
 Olean, N. Y., 2653b
 Oleaner, 2653b
 Oleomargarine, 2653b
 Olfactory Nerves, 2513a, 3225b
 Oligarchy, 1542b
 Olive, 2654a
 Olive Oil, 2654a
 Oliver Optic, 22b
 Oliver Twist, 1072a
 Olives, Mount of, 2654b
 Olvin, 217b
 Olmsted, Frederick Law,
 2654b
 Olney, Richard, 2654b
 Olympia, 2655a
 Olympia, Wash., 2655a
 Olympiad, 2655b
 Olympian Games, 2655b
 Olympic (ship), 2353b
 Olympic Mountains, 2609b
 Olympus 1567b 2655a
 Omaha, Nebr., 2655a
 Oman, 2656b
 Omar, Mosque of, 2527b
 Omar Khayyam, 2657a 2980a
 Omega and Alpha, 102a
 Omega, 2657a
 Omnibus Bill, 2657a
 Omok, Siberia, 2657a
 On Conciliation with America,
 265a
 Omega Lake, 2657b
 Omega River, 2657b
 Oneida Community 2657b
 Oneida Indians 2657b
 Oneida Lake 2658a
 One-step, 1025b
 One Sweetly Solemn Thought,
 1750b
 On His Own Blindness, 2342b,
 2646a
 Onion 2658a
 Onondaga Indians, 2658a
 Ontario, 2658a
 Ontario Lake, 2662b
 Onyx, 2662b
 Opal, 451a
 Open-heart Steel, 2412b
 Open-kettle Method, 453b
 Ophthalmia, 217a
 Ophthalmia Neonatorum 471b
 Opium, 125b, 2415b, 2664b
 Opium War, 2664a
 Operto, Portugal, 2665a
 Opessum, 2665b
 Oppen, Frederick Burr, 2668a
 Optic Nerve, 1287a
 Optics 210a
 Optimism 2668a
 Oracles, 2668a
 Oran, Algeria, 2668b
 Orange, 2668b
 Orange, N. J., 2668a
 Orange Free State, 2668a
 Orangemen, 2668b
 Orange River, 2669a
 Orange-utan, 2669a
 Oracion, 2669b

Oratorio, 2670a
 Orchestra, 2670a
 Orchids, 2670a
 Ordeal, 2670b
 Order, 2671a
 Order, Points of, 2749a
 Order of Saint George, 2671a
 Order of the Bath, 2671a
 Order of the Garter, 2671a
 Orders, Religious, 2322b
 Orders in Council, 2671b
 Ordinance of 1787, 2671b
 Ordinance, 232a
 Ordinance Department, 226a
 Ordovician Period, 2671b
 Ore, 2672a
 Oreads, 2625b
 Oregon, 2672a
 Oregon, University of, 2677a
 Oregon Fir, 2394a
 Orestes, 2677a
 Organ, 2677b
 Organ of Corti, 1183b
 Organ of Eury, 3130a
 Oridamme, 2678a
 Origin of Species, 1081a, 1743a
 Orilla, Ont., 2678a
 Orinoco River, 2678b
 Orisole, 2678b
 Orion (astronomy), 2679a
 Orion (mythology) 2678b
 Orkney Islands, 2679a
 Orleans (family), 621b 2679b
 Orleans, Battle of, 1519b
 Orleans, France, 2679b
 Orleans, Louis Philippe, Duke
 of, 2679b
 Orleans, Mald of, 1897a
 Orleans, Philippe, Duke of,
 2680a
 Orleans, Philippe (Regent of
 France), 2680a
 Orion Diamond 1070b
 Ornithology 2680a
 Ornithorynchus, 1150a
 Orpheus, 2678a, 2680a
 Orpheus and Euridice, 1524b
 Orris Root, 2680b
 Orsini (family), 2680b
 Orthoceras, or Othoceratite,
 2680b
 Orthoclase, 1027b
 Orthography, 2631a
 Orthopedics, 2684a
 Orthoptera, 2684a
 Ortolan 2684a
 Oryx, 137b
 Osage Indians, 2684a
 Osage Orange 2684b
 Osage River, 2684b
 Osaka, Japan, 2684b
 Oscar I, 2685a
 Oscar II, 2685a
 Oseola, 2685a
 Osel Island, 2685a
 Oshawa, Ont., 2685b
 Oshkosh Wis., 2685b
 Osiris, 2685b
 Oskaloosa Iowa 2686a
 Oster, William, 2686a
 Ostium, 2686b
 Osmosis, 2686b
 Osprey, 1324a
 Osseous Tissue, 222a
 Ossining, N. Y., 2686b
 Oseell Sarah Margaret Fuller,
 2687b
 Ostend, Belgium, 2687a
 Ostend Manifesto, 2687b
 Osteopathy 2687b
 Osteoclast 2687b
 Ostreich, 457b, 2688a
 Ostrogoths, 1540a 1852b
 Oswego N. Y., 2689a
 Opal, 2689a
 Otsego, 2689b
 Open Air Schools, 2689a
 Open Shop, 2689a
 Opera, 2689a
 Opera Glass, 2689a
 Ophir, 2689b

Ophthalmoscope, 2664b
 Otho I, 2689a
 Otis, James, 2690b
 Ottawa, Ill. 2689b
 Ottawa, Kan., 2690a
 Ottawa, Ont., 2690a
 Ottawa Indians, 2689b
 Ottawa-Rideau System, 679a
 Ottawa River, 2690b
 Otter, 2690b
 Otto I, 2691a
 Ottoman Empire, 2649a
 Ottoman Turks, 2691a
 Ottumwa, Iowa, 2691a
 Ouachita River, 2623a
 Ounce (animal), 2691b
 Ounce (weight), 2691b
 Our Mutual Friend, 1072b
 Outenault, Richard Feiton,
 2691b
 Out-Door Amusements, 1974a
 Outram James, 2692a
 Ousel, 2692a
 Ovary, 1354a
 Ovan Bird 2692a, 2603b
 Overshot Wheel, 2331a
 Over the Teacups, 1708b
 Ovid, 2692a
 Ovules, 1545a
 Owen, Robert, 2692b
 Owensboro, Ky., 2692b
 Owen Sound, 2692b
 Owl, 2692a
 Owl and the Pussy Cat, The,
 2022a
 Owosso, Mich., 2692b
 Oxalates, 2692a
 Oxalic Acid, 139b, 2693b
 Oxensterna, 2697a
 Ox-eye Daisy, 117b
 Ox Family, 4982a
 Oxford, Eng., 2694a
 Oxford Movement, 2684a
 Oxford University, 2694b
 Oxidation, 2695a
 Oxide, 2695a
 Oxidizing Flame, 476b
 Oxygen, 2695a
 Oxygenated Water, 1746b
 Oxhydrogen Light, 1207b
 Oyster, 1207b
 Oyster, 2695a
 Oyster Catcher, 2697a
 Oyster Plant, 2697a
 Osaka, Japan, 2684b
 Oskaloosa Mountains 2697b
 Ozone, 767b, 2697b

P

P, 2698a
 Pachyderm, 2698a
 Pacific Cables, 527a
 Pacific Ocean, 2698a
 Paddleship, 2698b
 Paddy, 2698b
 Paderewski, Ignace Jan, 2699a,
 2699b
 Padua, Italy, 2699a
 Paducah, Ky., 2699b
 Paganini, Niccolò 2699b
 Page, Thomas Nelson 2700a
 Page, Walter Hines, 2700b
 Pageant, 2700b
 Pagoda, 2701a
 Paine, Thomas, 2701a
 Paint, 2701b
 Painter, 2726b
 Painting, 2702b
 Pakenham, Edward Michael,
 2711a
 Palace of Versailles 2762a
 Palais de l'Elysee, 2737b
 Palanquin, 2711a
 Palate, 2711b
 Palatinat 2711b
 Palatine Hill, 3202b, 3106b
 Paleontology, 2712a
 Paleozoic Era 2712a

The letter a, after a number, indicates column 1; the letter b column 2

- Palermo, 2713a
 Palestine, 2713b
 Palestine, Texas, 2713a
 Palestre, Giovanni Pierluigi da, 2713a
 Pallas, The, 2553a, 2713b
 Palladium (metal), 2713b
 Palladium (statue), 2713b
 Pallas Athens, 2345b
 Palm, 2714a
 Palma, Tomas Estrada, 2714b
 Palm Beach, Fla, 2714b
 Palmerston, Henry John, 2715a
 Palmetto, 2715a
 Palmetto State, 2359a
 Palmistry, 2715b
 Palm Oil, 2715b
 Palm Sunday, 2716b
 Palmyra, 2717a
 Palmyra Palm, 2717a
 Palo Alto, Battle of, 2717a
 Palo Alto, Cal, 2717b
 Palpitation of the Heart, 2717b
 Pamir, 2717b
 Pamlico Sound, 2717b
 Pampanzani, 2818a
 Pampas, 2718a, 2852b
 Pan, 2718a
 Panama (city), 2718a
 Panama, Isthmus of, 2718b
 Panama, Republic of, 2718b, 3111b
 Panama Canal, 2720a, 3111b
 Panama Hat, 2723b
 Panama-Pacific International Exposition, 2723b
 Pan-American Congress, 2724a
 Pan-American Exposition, 2725a
 Pan-American Union, 2725a
 Pancake, The (story), 1960b
 Pancake Tuesday, 2291a
 Pancreas, The, 2725b
 Pangloss, 2725b
 Pandanus, 2725b
 Pandora, 2725b
 Pan-Germanism, 2914b
 Panhandle, The, 2552a
 Panhandle State, 2852a
 Pankhurst, Emmeline, 2726a
 Pantasote, 2973a
 Pantheism, 2726a
 Pantheon, 2726b, 2909b
 Panther, 2726b, 2859a
 Pantomime, 2726b
 Papacy, The, 2900b
 Papal States, 2726b, 2902a
 Papaw, 2727a
 Paper, 2727a
 Paper Birch, 449a
 Paper Blockade, 473b
 Paper Cutting, 1970a
 Paper Folding, 1968a
 Paper Money, 2385b
 Paper Nautilus, 171a, 2492b
 Paper Sailor, 171a
 Papier-mache, 2729a
 Papillae, 3219b
 Papineau, Louis Joseph, 2729a
 Paprika, 2729b
 Papyrus, 2727a, 2729b
 Para, Brazil, 2730a
 Parable, 2730a
 Paracelsus, 2730a
 Parachute, 2730b
 Paraclete, 2a
 Paradise, Birds of, 458b
 Paradise Lost, 2730b, 2730b
 Paradise of the Pacific, 2617a
 Paraffin, 2731a
 Paraguay, 2731a
 Paraguay River, 2732a
 Paraguay Tea, 2279b, 2354b
 Parallel Bars, 1600b
 Parallel Drawing, 1132a
 Parallelogram, 2977a
 Parallelogram of Forces, 2732b
 Paralysis, 2732b
 Paramaribo, Dutch Guiana, 2732a
 Parana River, 2732a
 Para Nut, 547b
 Parasites, 214a, 520a, 2732a
 Parasitic Diseases, 2732b
 Paravane, 2737b
 Parcase, 1361b
 Parcel Post, 2732b
 Parchment, 2732b
 Pardon, 2734b
 Parent and Child, 2734b
 Parent-Teachers Association, 2734b
 Paresia, 2735a
 Parhelion, 2735a
 Paris (mythology), 2457b, 2735a
 Paris, France, 2735b
 Paris, Louis Albert Philippe D'Orleans, 2739b
 Paris, Tex, 2739b
 Paris, Treaties of, 2739b
 Paris, University of, 2740a
 Paris Green, 139b, 2740b
 Park, Mungo, 40b
 Parker, Alton Brooks, 2740b
 Parker, Francis Wayland, 2740b
 Parker, Gilbert, 2741a
 Parkersburg, W. Va., 2741a
 Parkman, Francis, 2741b
 Park Mountains, 2058b, 2089a
 Parks, National, 2741b
 Parks of Canada, 2743a
 Parks of the United States, 2741b
 Parlement, 2743b
 Parliament, 2743b
 Parliamentary Law, 2747a
 Parma, 223a
 Parnassus, 2749a
 Parnell, Charles Stewart, 1712a, 2749a
 Parochial Schools, 2749b
 Parody, 2749b
 Parole, 2750a
 Parakeet, 2750a
 Parthianus, 2703a
 Parria, Samuel, 2902b
 Parrish, Maxfield, 2750a
 Parrot, 2490a, 2750b
 Parry Sound, 2750b
 Parsifal, 1649a, 2751a
 Parsing, 2055a
 Parsia, 2751a
 Parley, 2751b
 Parsnip, 2751b
 Parsons, Kan, 2751b
 Parthenon, 2751b
 Participle, 2752a
 Partnership, 2752b
 Partridge, 1587a, 2753a
 Partridge, William Ordway, 2753a
 Par Value, 2425a
 Pas, Man, 2753b
 Pasadena, Calif, 2753b
 Pascal, Blaise, 2754a
 Pascal's Law, 2754a
 Pasqua Florida, 1582b, 2898b
 Pasqua, 2754a
 Pasig River, 2614b
 Pass, 2734a
 Passaic, N. J., 2754a
 Passenger Pigeon, 2851b
 Passion Flower, 2754b
 Passion Play, 2754b
 Passover, 2754b
 Passport, 2755a
 Pasteur, Louis, 2755a
 Pastoral Poetry, 2755b
 Patagonia, 2755b
 Pate de fole gras, 1636b
 Patella, 2134b
 Patience, 2755a
 Patent (homestead), 1712a
 Patent Leather, 2073a, 2756a
 Paterson, N. J., 2756b
 Patmos, 2756b
 Patna, British India, 2757a
 Patriarch, 2757a
 Patrician, 2757a
 Patrick, Saint, 2757a
 Patriotism (theme), 2559b
 Patroclus, 1753b
 Patron System, 2757b
 Patti, Adelina Maria Clorinda, 2757b
 Paul (Popes), 2757b
 Paul, Saint, 2758a
 Paulists, 2758b
 Paul, Reverend's Ride, 512a, 2018b
 Pausanias, Julian, 2758b
 Pausanias, 2758b
 Pavement, 2759a
 Pawnbroker, 2759b
 Pawnee, 2760a
 Pawpaw, 2727a
 Pawtucket, R. I., 2760a
 Payne, John Howard, 2760a
 Payne-Aldrich Law, 2802a, 2815b
 Pea, 2760b
 Peabody, George, 2761a
 Peabody Education Fund, 2760b
 Peace, Breach of the, 2761a
 Peace, League to Enforce, 2071a
 Peace Conference, International, 2761a
 Peace Offering, 2153a
 Peace of Utrecht, 2720b
 Peace River Country, 2762a
 Peace River Pass, 73a
 Peach, 2762a
 Peacock, 2763a
 Peale, Charles Wilson, 2763b
 Pease, Rembrandt, 2763b
 Peanut, 2764a
 Pear, 2764b
 Pearl, 461a, 2489a, 2764b
 Pearl Harbor, 1645a
 Pearl Spar, 1093a
 Peary, Robert Edwin, 2765a
 Peary's Expedition, 2803b
 Peasants War, 2765b
 Peat, 2766a
 Pecan, 2766a
 Peccary, 2766b
 Peck, James, 2775a
 Pecos River, 2766b
 Pedagogy, 2766b, 2960a
 Pediment, 2767b
 Pedometer, 2767b
 Pedro II, 2768a
 Peel, Robert, 2768a
 Peer, 2768a
 Peerage, 2768a
 Pegasus, 2768b
 Pekin, Ill, 2768b
 Peking, China, 2768b
 Pelagius Islands, 1847b
 Pelagians, 2769b
 Peise, Mont, 2861b
 Pelican, 2769b
 Pelican State, The, 2773a
 Pellagra, 2770a
 Peloponnesian War, 1570a
 Peloponnesus, 2770a
 Pelopae, 2770a
 Pelvis, The, 2770b, 3318b
 Pelvic Girdle, 3318b
 Pemberton, John Clifford, 2770b
 Pembroke, Ont, 2770b
 Pemmican, 2770b
 Pen, 2771a
 Penance, 2771b
 Penang, 2771b
 Pennil, 2771b
 Pendant, 2772a
 Pendennis, 2854b
 Pendleton, Ore, 2772a
 Pendulum, 2772a

- Penelope, 2773a, 3665b
 Penguin, 2773a
 Peninsula State, The, 1349a, 2325a
 Peninsular War, 2472a, 2773b
 Penn, William 2774a
 Pennacook, 2774b
 Pennell, Joseph, 2774b
 Pennsylvania, 2775a
 Pennsylvania, University of, 2780b
 Penny, 2781a
 Pennyroyal 2781a
 Penobscot River 2781a
 Pensacola, Fla., 2781a
 Pension, 2781b
 Pension, Old Age, 2652a
 Pentameter, 2781b
 Pentateuch, 2782b
 Pentecost, 2782b
 Pennumbra 2783a
 Peonage 2783a
 Peony, 2783a
 People a Party, 2891a
 People, III, 2783a
 Pepp, 2783
 Peplon, 1143b
 Pepper, 2784a
 Pepperidge, 465a
 Peppermint, 2784b
 Pepsin 2784b
 Peptones, 2784b
 Peppy, Samuel, 2784b
 Pequot, 2784b
 Percentage, 2784b
 Perception 2787b
 Perch, 2788a
 Perennials, 428b, 2788a
 Perfumes, 2788a
 Pericardium 1655b, 2789a
 Pericles, 2789a
 Peridot, 461a 517b
 Perigee, 2789b
 Peristoleum, 495b
 Peripatetic School of Philo-
 sophy, 173a 2789b
 Periscope, 4454b
 Peritonium, 5b
 Peritonitis 2790a
 Periwinkle 2447a
 Perjury, 2790a
 Permanent Court of Interna-
 tional Justice, 2790a
 Permalan Period, 2790b
 Pernambuco Brazil 2790b
 Peroxide of Hydrogen, 1746b
 Perpetual Motion, 2791a, 2836b
 Perrault, Charles, 2423b, 2791a
 Perry, Bliss 2791a
 Perry, Matthew Calbraith,
 2791b
 Perry, Oliver Hazard, 2791b
 Perryville Battle of, 2792a
 Persephone, 2950a
 Persepolis 2792a
 Perseus, 2792a
 Pershing, John Joseph, 2792b,
 3932b
 Persia 2793a
 Persian Gulf 2796b
 Persian War 1572b
 Persian Wheel 2796b
 Persimmon 2796b
 Personal Property 2796b
 Personification 2797a
 Perspective, 1113a 2797a
 Perspiration 2797b
 Perth Western Australia,
 2497b
 Perth Amboy, N. J., 2797b
 Peru 2798a
 Peru, III 2800a
 Peru Ind., 2800a
 Perucino, Pietro Vannucci,
 2800b
 Peruvian Bark 2800b
 Peruvian Current, 2630b
 Peseta, 2800b
 Peso 2800b
 Pessimism, 2666a, 2801a
 Pestalozzi, Johann Heinrich,
 2801a, 2801a
 Pétain, Paul Philippe, 2801b
 Petals, 1354a
 Peter, 2802a
 Peter I (Serbia), 2802b
 Peterborough Ont., 2803a
 Petersburg, Siege of 2803b
 Petersburg, Va., 2803a
 Peter the Great, 726a, 2802a,
 3095a
 Peter the Hermit, 997a, 2803b
 Petition, 2803b
 Petition of Right, 2804a
 Petit Jury, 1919b
 Petrarch, Francesco, 2804a
 Petrel, 2804a
 Petrograd, Russia, 2804b
 Petroleum 2806a, 2678a
 Petunia, 2807b
 Pewee, 2823b
 Fawster, 2807b
 Phacelia 2808a
 Phaedrus, 2808a
 Phaethon, 2452a, 2808a
 Phalanges 1358a, 1623a, 3218b
 Phalanx, 2808a
 Phanerogamous Plants, 517a
 518b, 2808a
 Pharaoh, 1190b, 2808b
 Pharaoh's Hen, 3782b
 Pharaoh's Hat 1757a
 Pharisees, 2808b
 Pharmacist, 146a
 Pharmacopoeia 2808b
 Pharmacy, 2809a
 Pharos, 2809a
 Pharynx, 2809a
 Pheasant, 1587a, 2809a
 Pheasant's Eye 27b
 Phenacetin, 139b, 2809b
 Phenic Acid 100a
 Phenol, 700a
 Phi Beta Kappa, 2809b
 Phidias, 2810a
 Phi Kappa Phi, 2810a
 Philadelphia, Pa., 2810b
 Philae, 2813a
 Philanthrop, 281a
 Philip (the Evangelist) 2813b
 Philip IV (France), 2814a
 Philip VI (France) 2814a
 Philip II (Spain), 2814a
 Philip V (Spain), 2814b
 Philip of Macedon, 2814b,
 3377a
 Philippos, 1056a, 1574b
 Philippine Islands 2815a
 Philip the Fair, 2814a
 Philistines 2820a
 Phillips, Wendell, 2820a
 Philology, 2820a
 Philomela 2822a
 Philosopher's Stone, 75b
 Philosophy, 3822b
 Phlox, 2823b
 Phoebe 2823b
 Phoenicia 2824a
 Phoenicians 3773a
 Phoenix 2824b
 Phoenix, Ariz 2824b
 Phonetics 2826a
 Phonograph 1832a 3505a
 Phonography 3287b
 Phosphates, 2625a
 Phosphorescence, 2825b
 Phosphoric Acid, 2825b
 Phosphorus, 139b 2825b
 Phosy Jaw, 2826a
 Photo-Engraving, 2826a
 Photographic Surveying,
 2826a
 Photography, 2826b
 Photogravure 2827b
 Photometry, 2828a
 Photosphere 3470b
 Phenology 2828a
 Phrygia, 2829a
 Phylloxera, 1080b 2829a
 Physical Culture 2829a
 Physical Geography, 1461b,
 2829b
 Physical Work, Unit of, 3670b
 Physics, 2835b
 Physiognomy, 2840a
 Physiography, 1461b, 2829b
 Physiology, 2840b
 Pia mater, 542a
 Pianissimo 2442a
 Piano, 2846a
 Pianoplayer, 2846b
 Piacenza, 2847a
 Picadore, 598b
 Piccilli, 2847a
 Piccolo, 2846b
 Pickeral, 2847a, 2852b
 Pickering John 1775a
 Pickett, George Edward, 2847a
 Pickles 2847a
 Picric Acid, 2847a
 Picts, 2847b
 Pickwick Papers, 1072a
 Pictured Rocks, 2473b
 Picture-Making Material,
 183a
 Picture Study 2706b
 Piedmont, 2847b
 Piedmont Region 2847b
 Pled Piper of Hamelin, The
 (theme) 3559a
 Pileant, 3087a
 Pile 2847b
 Pierce, Franklin 2848a
 Pierre, S. D. 2851a
 Pigeon, 1108b, 2851a
 Pigeon Berry 2852b
 Pigment 2701b
 Pig-tailed Baboon, 310a
 Pigweed, 2851b
 Pike 2852a
 Pike, 2852a
 Pike Zebulon Montgomery,
 2852a
 Pikes Peak 855b, 2852b
 Plaster, 2852b
 Pilate Pontius 2852b
 Pilcomayo 2852b
 Pile 2852a
 Pillgrims 2853a 3555b
 Pilgrim's Progress 502a
 Pillars of Hercules 277a
 1510a
 Pillory, 2853a
 Pilot, 2853b
 Pilot Fish, 2853b
 Plaudski Joseph, 2853b
 Plum, 282b
 Puma 2853b
 Pimento 2853b
 Pin 2853b
 Pinafore, 1511a 3467a
 Pina Muslim 2856b
 Pinchot, Gifford 2854a
 Pinckian Hill, 3049a
 Pinckney, Charles Cotesworth
 2854b
 Pincon, Yanez, 108b
 Pindar 2854b
 Pine 516b 2854b
 Pineapple 2856a
 Pine Barren Beaut, 2976b
 3269a
 Pine Bluff Ark 2856b
 Pine Family, 161b
 Pincus Arthur Wing 2856b
 Pine Snake 2856b
 Pine Tree Shilling 2857a
 Pine Tree State The 2222b
 Ping Pong 2857a
 Pink 2857a
 Pin Money 2857a
 Pin Pool, 2859b
 Pipe Tobacco 2857a
 Pipe Clay 841b
 Pindoff, 2857b
 Pipe Lane 2857b
 Pipe of Peace, 647a
 Pipit 2858a
 Pippa Passes 547b
 Pipkin 2783b
 Pipkin the Short, 703a
 Piqua Ohio 2858a
 Piquet, 2858b
 Piracy, 2858b

The letter a, after a number, indicates column 1; the letter b, column 2.

- Piraeus 2558b
 Pirates of Penzance, 1511a, 3467a
 Pirat Council of, 2559a
 Pisa, Italy, 2559a
 Pisa, Leaning Tower of, 2559a
 Pierce, 1330b 2559b
 Pisciculture, 1330b
 Piscivorous 271b, 2859b
 Pistachio 2559b
 Pistill, 619a 1354a
 Pistol 3077b
 Pitchblende 2859b
 Pitcher Plant 21a, 2859b
 Pitch Lake, 2635a
 Pitman (family), 2560a, 2327a, 3288b
 Pitt (family), 2560b
 Pitt Palace 2561a
 Pittsburg Kan., 2851a
 Pittsburgh Pa. 2561b
 Pittsburgh Landing, Battle of, 3280b
 Pittsfield, Mass., 2862b
 Pittston, Pa. 2562a
 Pius (Popes), 2862a
 Pixies 129a
 Pizarro 1775b, 2863b
 Place de l'Hotel, 2137a
 Place Vendôme, 3748a
 Plaque 2564a
 Plain, 2864b
 Plane, 2561b
 Planet, 2671 2865a
 Planetesimal Hypothesis, 1167b, 1477a
 Planetoid 257a, 2865a 2866a
 Planing Machine 2866a
 Planitancy 2869a
 Plantain 269a
 Plant Families, 623a
 Plant Industry Bureau of 51a
 Planting of the Apple-Tree, The, 2037a
 Plant Lice 144b
 Plants, 247a, 2866b 3338b
 Plants Aromatic, 231b
 Planterter, 2869b
 Planter of Paris, 2869b
 Plant Rio de la, 3077b
 Platana 2469b
 Plateau 2870a
 Plate Glass, 1522a
 Platform Scale, 3842b
 Platina 2670a
 Platinum 2870a
 Plato 2871a
 Platoon 226b
 Platt Thomas Collier, 2871b
 Plattdeutsch 2871b
 Platt National Park, 2742b
 Platte River 2871b
 Plattsburgh, N. Y., 2872a
 Plattsburgh Idea 2872a
 Plautus Titus Maccius 2872a
 Play Hide and Go Seek, 182a
 Play 1438b
 Pleistocene 2872b
 Pleistocene 2872b
 Pleura 5b 2872b
 Pling the Elder 2873a
 Pling the Younger 2873a
 Pliorone Period, 2873a
 Plough Monks, 2882b
 Plower 2573b
 Plow 2873b
 Plow 2874a
 Plowman 476a
 Plumber, 1101b 2874a
 Plumb Line 2874b
 Plummet 2474b
 Plush 2474b 3477b
 Plutarch, 276a
 Plutarch's Lives 2875a
 Plute 2474b 2475a
 Plutus 2875a
 Plymouth Eng., 2475b
 Plymouth Mass., 2475b
 Plymouth Pa. 2876a
 Plymouth Colony, 2876a 3701b
 Plymouth Company, 2876b
 Plymouth Plantation, History of, 638b
 Plymouth Rock, 2876a
 Pneumatic, 2876b
 Pneumatic Tires, 2876b
 Pneumatic Tools, 2877a
 Pneumatic Tubes, 2877b
 Pneumogastric Nerve, 2507b
 Pneumonia, 2877b
 Po River, 2877b
 Pocahontas, 2878a, 3327a
 Pocattello, Ida., 2878a
 Poe, Edgar Allan, 2878a
 Poem, 2023b, 2022a
 Poem, Study of a, 2021b, 2029a
 Poet Laureate, 2878b
 Poetry, 2879a
 Poets Corner, 3851a
 Pogy, 2298a
 Poincare, Raymond, 2880a
 Poinsettia, 2880a
 Point Barrow, 64a
 Pointer, 2880a
 Point of Order, 2749a
 Poisson, 2880b
 Poison Gas, 2881a
 Poison Ivy, 2882a
 Poisonous Plants, 2882a
 Poitiers, France, 2882b
 Poker, 2882b
 Pokeweed, 2882b
 Poland, 2883a
 Polar Exploration, 2602b, 3366b
 Polar Hare, 1625a
 Polariscopes, 2884b
 Polarization of Light, 2884b
 Pole, 2885a
 Polecat, 2885a
 Pole Star, 2885b
 Pole Vault, 274a, 2885b
 Police, 2885b
 Polish Succession, War of the, 3459a
 Political Divisions, 1465a
 Political Economy, 1175a
 Political Geography, 1461b
 Political Parties in the United States, 2886a
 Polk, James Knox, 2891b
 Polka, 1025a
 Pollen, 1354a, 2894b
 Pollination, 2895a
 Poll Tax, 2896a
 Pollux, 726b
 Polo, 2895a
 Polo, Marco, 2895b
 Polygamy, 2267a, 2895b
 Polygons, 2899a, 2896b
 Polychromia, 2438b
 Polynesia, 2622a, 2896a
 Polyp, 3896a
 Polypheum, 2895b, 2896a
 Polytheism, 2899a, 2896b
 Pomegranate, 2896b
 Pomele, 1554b
 Pomerania, 2896b
 Pomeranian Dog, 3387b
 Pomona, 2896b
 Pomona, Calif., 2896b
 Pompadour, Madame de, 2172a, 2897a
 Pompano, 2897a
 Pompell, 2897a
 Pompey, 2898a
 Pompey's Pillar, 2898a
 Ponce de Leon, 1387a, 2898b, 2913b
 Pond Lily 3827a
 Pons Sublicus 655a
 Pontchartrain, Lake 2898b
 Pontiac (Indian), 2898b
 Pontiac, Mich., 2899a
 Pontoon Bridge, 2899a
 Pontus Lucius, 466b
 Poodle 2899a
 Pool, 2899a
 Poole William Frederick, 2900a
 Poona British India, 2900a
 Poor Riots, 3551b
 Poor Richard's Almanac 100b, 3403b, 2900b
 Poor Robin's Almanac, 100b
 Pop Corn, 2488b
 Pope, 2900b, 2003b
 Pope, Alexander, 2903b
 Poplar, 251a, 2904a
 Poplin, 2904a
 Popocatepetl, 2904a
 Poppy, 2904a
 Poppy Family, 525a
 Poppy Family, 2905b
 Popular Sovereignty, 3395b
 Population, 2904b
 Population, Center of, 3690a
 Population, Density of, 3690a
 Populist Party, 2891a
 Porcelain, 2906a, 2925b
 Porcelain Clay, 844b
 Porcelain Jasper 1879a
 Porch of the Maidens, 1240b
 Porcupine, 2908a
 Porcupine, Ont., 2906b
 Porcupine Ant-eater, 127a
 Porry, 2906b
 Pork, 1705a, 2906b
 Porosity, 2906b
 Porphyry, 2907a
 Porpoise, 2907a
 Porpoise Oil, 389a
 Port Adelaide, 84b
 Portage La Prairie, Man., 3907a
 Portals, 3187a
 Portal Circulation, 826b
 Portal Vein, 2143b
 Port Arthur, Manchuria, 2907b
 Port Arthur, Ont., 2907b
 Port Arthur, Siege of, 2146b
 Port Arthur, Tex., 2908a
 Port-au-Prince, Haiti, 2908a
 Forte, The Sublime, 825a
 Port Elizabeth, 2908b
 Porter, David, 2908b
 Porter, David Dixon, 2908b
 Porter, Gene Stratton, 2909a
 Porter, Jane, 2909a
 Porter, James Sydney, 2909a
 Port Hope, Ont., 2909b
 Port Huron, Mich., 2909b
 Portinari, Beatrice, 1026b
 Portland, Maine, 2910a
 Portland, Ore., 2910a
 Portland Cement, 785b
 Port Nelson, 1730a
 Porto Alegre, Brazil, 2911a
 Port of Entry, 2911a
 Port of Spain, Trinidad, 2811b, 3622a
 Porto Rico, 2911b
 Port Said, Egypt, 2914a
 Portsmouth, Eng., 2914a
 Portsmouth, N. H., 2914a
 Portsmouth, Ohio, 2914b
 Portsmouth, Va., 2914b
 Portugal, 2915a
 Portuguese Colonies, 882b
 Portuguese East Africa, 2918b
 Portuguese Guinea, 2919a
 Port Wine, 2919a
 Posen, 2919a
 Possessions of the United States, 3694a
 Postage Stamps, 2919a
 Postal Savings Banks, 3205a
 Postal Union, International, 2919b
 Postoffice Department, 2920a
 Potash, 2922a
 Potassium, 2922b
 Potassium Bichromate, 983b
 Potato, 2922b, 2491a
 Potato, Sweet, 2482a
 Potato Bug, 2923b
 Potential Energy, 1226a
 Potomac River, 2924a
 Potsdam, Prussia, 2924a

The letter a, after a number, indicates column 1; the letter b, column 2.

- Potawatomi Indians, 2924a.
 Potter's Clay, 344b
 Pottery, 2924b
 Pottstown, Pa., 2925b
 Pottsville, Pa., 2925a
 Poughkeepsie, N. Y., 2926a.
 Poultry, 2926b, 3685a.
 Pound, 2927b
 Poundal, 1159a
 Pound Sterling, 2927b
 Powderly, Terence Vincent, 2927b
 Powell, John Wesley, 2927b
 Powell, Maud, 2927b
 Power, 2928a
 Power of Attorney, 2928a
 Powers, Elram, 2928a
 Powers of Congress, 316a
 Powers of Parliament (Canada), 3746a.
 Powhatan, 2928b, 3327a
 Praetor, 2928b
 Praetorian Guard, 2928b
 Pragmatic Sanction, 2929a
 Prague, Bohemia, 2929a
 Prague, University of, 2929b
 Prairie, 2929b, 3674b
 Prairie Chicken, 2930a
 Prairie Dog, 2930a.
 Prairie Hare, 1628a
 Prairie Schooner, 1923a
 Prairie Squirrel, 1537a
 Prairie State, The, 1764a.
 Praxiteles, 2930a, 3232a
 Prayer Rug, 3130a
 Precedence, Illustration of, 3746b
 Precession of the Equinoxes, 2930b
 Precious Stones, 2930b
 Predetermination, 2931a.
 Presumption, 2931a.
 Prefect, 1051a
 Premier, 2931b
 Proposition, 2932a
 Pre-Raphaelites, 2932a.
 Presbyterians, 2932a
 Prescott, Ariz., 2932a
 Prescott, William Hickling, 2932a
 President of the United States, 2932b
 Presidio, 3156b
 Press Liberty of the, 2935b
 Pressburg, Hungary, 2936b
 Preston, Ont., 2936b
 Pretoria, Transvaal, 2937a
 Prevailing Westerlies, 2937a
 Previous Question, 2748a
 Pre-Vocational Education, 3755b
 Priam, king of Troy, 2455b, 2937a
 Pribilof Islands, 2955b, 3240b, 2937a.
 Prickly Ash, 2937b
 Prickly Pear, 2937b
 Pride's Purge, 3134a.
 Priest, 2938a
 Priesthood, The, 3083b
 Primary Colors, 854b
 Primary Department, 1977b
 Primary Election, 2938a
 Primate, 2938b
 Primogeniture, 2938b
 Primrose, 2938b
 Prince, 2938b
 Prince Albert, Sask., 2938a
 Prince Edward Island, 2939b
 Prince Henry of Battenberg, 3763b
 Prince of India, The, 3788a
 Prince of Wales, 3795b
 Prince of Wales Island, 66a
 Prince Rupert, B. C., 2940a
 Princess, The, 3543b
 Princeton, Battle of, 2940b
 Princeton, N. J., 2940b
 Princeton University, 2940b
 Princip, Gavril, 2916a
 Printing, 2941a
 Printing Press, 1823a, 2942b
 Printing Telegraph, 2930a
 Priory, 2a
 Prism, 2943a
 Prison, 2943b
 Prisoners of War, 2944b
 Priestarchus, 366a
 Private Banks, 323b
 Privateer, 2944b
 Privy Council, 2944b
 Privy Seal, 2945a
 Prix de Rome, 1175a
 Prize Fighting, 2945a
 Probate, 2945b
 Procedure, 2945b
 Proctor, Adelaide Anne, 2946a
 Proctor, Richard Anthony, 2946a
 Production, 3419a
 Profit Sharing, 2946b
 Program Music, 2946a
 Progress and Poverty, 3312a
 Progression, 2946b
 Progressive Party, 2891a, 3112a, 3603a.
 Prohibition, 2947a, 3718b, 3685a
 Prohibition Party, 2930b
 Prometheus, 2725b, 2948b
 Promissory Note, 2948b
 Pronghorn, 2948b
 Pronoun, 2949a
 Proof and Proof Reading, 2949a
 Propertius, 2950a
 Prosecuting Attorney, 1082a
 Prose, 3231b
 Proserpina, 2950a
 Proserpina, Story of, 2454b
 Protogoras, 3345b
 Protection, 1419b, 2950b
 Protective Coloration and Mimicry, 2950b
 Protective Tariff, 2515a
 Protectorate, 2951a, 3450b
 Proteids, 2744b, 2951a
 Proteins, 1095b, 1367a, 2951a
 Proterozoic Era, 2951b
 Protentulus, 2951b
 Protestant Episcopal Church, 1947b
 Protestant Missions, 2359b
 Protestants, 2951b
 Protoplasm, 2951b
 Protozoa, 2952a
 Proud Flesh, 1553b
 Proudhon, Pierre Joseph, 2952a
 Provencal Language and Literature, 2952b
 Proverbs, 2952b
 Providence R. I., 2952b
 Province, 2952b
 Provincial Courts in Canada, 295a
 Provo City Utah, 295b
 Prune, 2955b
 Pruning, 2955b
 Prussia, 1499b, 2956a
 Prussic Acid, 2957b
 Prussia, Book of, 1749b, 2957b
 Pseudonym, 2958a
 Psychology, 2958a, 2960a.
 Ptarmigan, 2963a
 Pteridophytes, 516b, 518a, 2963b
 Pterodactyl, 2963b
 Ptolemy (author), 2964b
 Ptolemy (family of kings), 2964a
 Ptolemy, Claudius, 265a
 Ptolemy Philadelphus, 53a
 Ptolemy Soter, 53a
 Ptomaline Poisoning, 2964b
 Ptomaines, 314b, 2964b
 Public Defender, 2964b
 Public Lands, 2012a, 2013b
 Public Lands in Canada, 2014a
 Public Roads, Office of, 51b
 Public Schools, 3212b
 Public Utilities, 2965a
 Pucini, Ovidio Nasso, 2962a
 Pucini, Giacomo, 2965b
 Pudding, 2965b
 Pudding Stone, 912b
 Pudd'nhead Wilson, 1225a
 Puebla, Mexico, 2965b
 Pueblo (illustration), 2889a, 2965b
 Pueblo, Colo., 2965a
 Puff Adder, 234a, 3775b
 Puffball, 2965b
 Puffin, 2965b
 Puffing Billy, 2149b
 Pug, 2967a
 Puget Sound, 2967a, 3810a
 Pulisna Judge, 2967b
 Pulaski, Casimir, 2967b
 Pulitzer, Joseph, 1910b, 2967b
 Puller, 2968a
 Pullman, George Mortimer, 2968a
 Pulmonary Artery, 5b
 Pulmonary Circulation, 2968b
 Pulmonary Veins, 1665a
 Pulmotor, 2968b
 Pulque, 2920b, 2968b
 Pulse, 2942a, 2968b
 Pulse Family, 525a, 2080a
 Pultowa Battle of, 1319b
 Puma, 2725b, 2969a
 Pumice, 2969a
 Pump, 2969a
 Pumpkin, 2970a
 Punctuation, 2970a
 Punda, 2970b
 Punic Wars, 2970b, 3100b
 Punishment, 791a
 Punjab, 2970b
 Punt, 452a
 Punta Arenas, Chile, 2970b, 3580b
 Pupa, 615a, 724b, 1507b, 2970b
 Purdue University, 2971a
 Pure Democracy, 1542a
 Pure Food Laws, 2971a
 Purgatory, 2971a
 Purikane, 2971b, 3602b
 Purple Flag, 1338a
 Purple Grackle, 396a.
 Purple Martin, 3479a.
 Purlane, 2971b
 Purlsey, 2971b
 Puss in Boots, 2791a.
 Puss-Willow, 3580a.
 Pustules, 3225a
 Putnam, Israel, 2971b
 Putnam, Rufus, 2972b, 2972a
 Putrefaction, 2972a
 Puttees, 3665b
 Putty, 2972b
 Pygmalion, 2972b
 Pygmies, 2972b
 Pyle, Howard, 2972b
 Pym, John, 2972a
 Pyorrhea, 2972a
 Pyramid (mathematics), 209a, 2972a
 Pyramidal Dynasty, 1190b
 Pyramide, 2973b, 3523b
 Pyramus, 2974b
 Pyrenees Mountains, 2974b
 Pyrite, 1587b, 2975a
 Pyrocellulose, 159a
 Pyrometer, 2975a
 Pyrotechny, 2975b
 Pyroxene, 282b, 2975b
 Pyroxylene, 1596a
 Pyrrha, 1058a
 Pyrrhus, 2975b
 Pythagoras, 2976a
 Pythagorean Theorem, 2976a
 Pythian Games, 2976a.

The letter a, after a number, indicates column 1; the letter b, column 2

Pythias, Knights of, 1989a
 Pythias and Damon, 1023b
 Python (mythology), 1976b
 Python (serpent), 2976b
 Pyxide, 2976b

Q

Q, 2977a
 Quadrant, 2977a
 Quadrilateral, 2977a
 Quadrille, 1026a, 2977a
 Quadroon, 2977a
 Quadruple Alliance, 2977b
 Quagmire, 2977b
 Quahog, 841b
 Quail, 2977b
 Quaker City, 2810b
 Quakers, 2978a
 Quantity, 2978b
 Quasipaw, 2978b
 Quarantine, 2978b
 Quarry and Quarrying, 2978b
 Quart, 2978b
 Quarter-deck, 2978b
 Quartermaster, 2978b
 Quartermaster Corps, 226a
 Quartz, 2979b
 Quartzite, 2980a
 Quartz Vein, 2980a
 Quassa, 2980b
 Quaternary Period, 2980a
 Quatrain, 2980a
 Quebec (province), 2980b
 Quebec, Battle of, 2984b
 Quebec, City of, 2985a
 Quebec Act, 2986b
 Quebec Bridge, 556a
 Quebec Resolutions, 2986b
 Quebec Tercentenary, 2987a
 Queen, 2987a
 Queen Anne's War, 1412b
 Queen Charlotte Islands, 2987a
 Queen of Roads, 147b
 Queensberry, John Sholto Douglas, 2987a
 Queensland, 2987a
 Queenston Heights, Battle of, 2988a
 Queensstown, Ireland, 2988b
 Quest of the Holy Grail, 2b
 Quetzal, 2988b, 3627b
 Quetzalcoatl, 308b, 2988b
 Quetzow, 491a
 Quicksand, 2988b
 Quicksilver, 2304b
 Quiller-Couch, Arthur Thomas, 2989a
 Quince, 2989a
 Quincy, III, 2989a
 Quincy, Josiah, 2989b
 Quincy, Mass., 2989b
 Quinine, 2989b
 Quinoa, 1537a
 Quinsy, 2990a
 Quintilian, 2990a
 Quintoon, 2977a
 Quintrail, 2990a, 3098b
 Quit Claim Deed, 1047a
 Quito, 2990b
 Quits, 2990b
 Quorum, 2990b
 Quotation Mark, 2991a
 Quo Vadis, 2992a
 Quo Warranto, 3949b

R

R, 2992a
 Rabbi, 2992a
 Rabbit, 1627b, 2992a
 Rabalais, Francois, 2992b
 Raccoon, 2993a
 Race, 2993b
 Racer Crab, 979b
 Races of Men, 2994a
 Rachel (Bible), 2994b
 Rachel-Felix, Elizabeth, 2995a

Racine, Jean, 2995b
 Racine, Wis., 2996a
 Rack, 2996a
 Radcliffe College, 2996a
 Radiata, 2996b
 Radiation, 1657a
 Radiolaria, 2996b
 Radio Telegraph, 2996b
 Radio Telephone, 2996b
 Radish, 2996b
 Radium, 2996b
 Radius, 826a
 Raft, 355b, 2997b
 Ragnorok, 2464b
 Ragtime, 2998a
 Ragweed, 2998a
 Raikes, Robert, 2998a, 3472a
 Rail, 2998a
 Railroad, 2998a
 Railroads in the U. S., 3657b
 Railroads of Canada, 3002a
 Railroad War Board, 3001a
 Railway Postoffice, 2920b
 Rain, 2021a, 3003a
 Rainbow, 1467b, 3004b
 Rainbow, The (theme), 3557b
 Rainbow Bridge, 3756a
 Rainfall in the U. S., 3677a
 Rain Gauge, 3005b
 Rain Goose, 1684a
 Tanager Mount, 3005a
 Raisin Lake, 3005a
 Raisin River, Massacre of, 3005a
 Raisins, 3005b
 Rajah, 3005b
 Rajputana, 3005b
 Raleigh, N. C., 3006a
 Raleigh, Walter, 3006b, 3779b
 Ralph Waldo Emerson, 1114a, 3661a
 Ramayana, 3007a
 Ramee, Louise de la, 3007a
 Rameses II, 1190b, 3007a
 Rameses III, 1190b
 Ramie, 486b
 Ramolino, Letitia, 2470b
 Ramon, 1564b
 Rana, 1141a
 Ranavalona II, 2210a
 Randolph, Edmund Jennings, 3007a
 Randolph John, 3007b
 Random Masonry, 2269b
 Rangoon, Burma, 3007b
 Ranjit Singh, 3007b
 Ranks, Leopold von, 3008b
 Rankin, Jeannette, 2399a
 3008b
 Rank in Army and Navy, 3008a
 Ranunculus, 3009a
 Rape of Lucrece, The, 3265a
 Rape of the Sabines, 3099b
 Raphael, 2705a, 3009a
 Rapids, 721a
 Rappahannock River, 3009b
 Raspberry, 3009b
 Rat, 3010a
 Ratchet, 3010a
 Ratel, 3010a
 Ratio, 3010a
 Rattan, 3010b
 Rattlesnake, 2490a, 3010b
 Raven, 3011a
 Ravine Deer, 1466b
 Ray, 3011b
 Razor, 3011b
 Reaction, 3011b
 Read, Ople Percival, 3011b
 Read, Thomas Buchanan, 3012a
 Reads, Charles, 3012a
 Reading, 3012a
 Reading, Methods of Teaching, 3028a
 Reading, Pa., 3029b
 Reading of Marley, Lord, 3029b
 Reagan, John Kenninger, 3030a
 Real-estate Mortgage, 2415b
 Realism, 3620b

Real Property, 3030b
 Realschuler, 148a
 Reaping Machine, 1822a, 2199a, 3030b
 Rear-Admiral, 26b
 Renson, 1262a, 2958b, 2962b, 3031a
 Rebecca of Sunnybrook Farm, 2135a
 Reckah, 407a
 Rebellion of 1837, 3032a
 Recall, The, 3032b
 Receipt, 3032b
 Receiver, 3032b
 Recessional, The, 1981a
 Recife, Brazil, 2790b
 Reciprocity, 3033a, 3516b
 Reclamation Act, 1842a
 Reclamation Service, 3033b
 Reconstruction, 3034a, 3711a
 Reconstruction Fin Corp., 3035a
 Rectified Spirit, 76a
 Rectum, 1822a
 Red, 3035a
 Redbird, 703a, 3035a
 Red Cedar, 3035a
 Red Cloud, 3035a
 Red Cross Society, 349a, 3035b
 Red Jacket, 3036a
 Redlands, Calif., 3036a
 Red Letter Days, 1312b
 Red Men, Improved Order of, 3036a
 Redmond, John Edward, 3036b
 Redpoll, 2116b
 Red River, 3036b
 Red River of the North, 3036b
 Red River Rebellion, 3037a
 Red Root, 1686a
 Red Sapphire, 3129a
 Red Sea, 413b, 3037b
 Red Spider, 3372b
 Redstart, 3037b, 3038b
 Redwing, Minn., 3038a
 Redwood, 3038a, 3256b
 Reed, Thomas, 3038a
 Reed Bird, 456b
 Reed, Myrtle, 3038a
 Reelfoot Lake, 3542a
 Referendum, 3038b
 Reflecting Telescope, 3535b
 Reflection of Light, 2101b
 Reflex Action, 2085b
 Reformation, 3039a
 Reformed Church, 3042a
 Reform Schools, 3042a
 Refracting Telescope, 3535b
 Refraction, 3042b
 Refraction of Light, 2102a
 Refrigerator Cars, 3000b
 Regatta, 2995b
 Regeneration, 3043a
 Regent, 3043a
 Regiment, 226b, 3043a
 Regina, Sask., 3043a
 Registered Bonds, 498a
 Registration, 3043b
 Registration of Births, Deaths, and Marriages, 3043b
 Registration of Deeds, 1047b
 Rehoboth, 151a
 Reichstadt, Napoleon Francis, 3043b
 Reichstag, 3044a
 Reid, Whitelaw, 3044a
 Reign of Terror, 3547a
 Reikjavik, Iceland, 3048a
 Reims, France, 3059a
 Reindeer, 66a, 3044a
 Reinforced Concrete, 908b
 Relationship, 3045a
 Relief, 102b, 359a, 2324a, 3129b
 Relief Map, 2474a
 Religion, 3045a
 Religious Liberty, 3046a
 Rembrandt, 3046b
 Remington, Frederic, 3047a
 Remsen, Ira, 3047a
 Remus, 2099b
 Renaissance, 3047b

Renaissance Architecture, 168a.
Renan, Ernest, 3049a
Renfrew, Ont., 3049a
Renl, Guido 1851a
Renmin 1075b
Reno, Nev., 3049a
Rensselaer, N. Y., 3049b
Rent, 3049b, 3744a
Reo, Teodoro, 3112b
Replevin, 3945b
Reply to Haynes, 2840b
Repousse, 1219b
Representatives, House of, 3050a
Reprise, 3051a
Reptiles, 3051b
Republic, 1642a
Republican Elephant, 2476a
Republican Party, 2839a, 3051b
Republican Party of 1801, 2837a
Republic of Panama, 2718b
Republic of Plato, 2871b
Reputation, 3052a
Requiem, 2710b
Requisition (law), 1236b
Resaca de la Palma, Battle of, 3052a
Reservoir, 3052a
Residual Air, 549b
Resins, 3052b
Resolutions of 1798, 1941b
Resigouche River, 3052b
Restoration, The, 3052b
Resumption of Specie Payments, 3739a
Resurrection, 3053a
Resurrection Plant 1887b
Reszke (family), 1061b
Retainer, 3053a
Retriever, 3053b
Reunion Ile de la, 3053b
Reval, Bathonia, 3053b
Revelle 592b
Revelation, Book of 3053b
Revelstoke, B. C., 3054a
Revenue Cutter Service, 867a
Revenue Flag 1341a
Revera, Paul, 3054b
Reveries of a Bachelor 2372a
Review Roundel (game) 1439b
Revival of Learning, 3047b
Revolution 3054b
Revolutionary War in America 3055a, 3702b
Revolver, 3057b
Rexford Eben Eugene 3058a.
Reykjavik, Iceland 3058a
Reynolds Joshua, 2705b, 3058a.
Rhadamanthus 3058b
Rhaetians 3489a
Rhea (bird), 3058b
Rhea (mythology), 3059a
Rheims, France, 3059a
Rhetoric 3059b
Rheumatism, 3059b
Rhine River, 3060a
Rhincoceros 3061a
Rhincoceros Bird 3061b
Rhizophora 3061b
Rhode Island, 3061b
Rhodes, Cecil, 3064b, 3065a.
Rhodes, Isle of, 3064b
Rhodesia 3065b
Rhodes Scholarships, 3066a
Rhododendron 3066b
Rhomb Spar, 1092b
Rhombus 3066b
Rhone River, 3066b
Rhubarb, 3067a
Ribbon 3067a
Ribbon Fish 3067a
Rib Grass 3067b
Rib, 3067b
Rice, 3067b
Rice, Alice Hegan, 3068b
Rice Hunting, 3068b, 3069a
Rice Paper 3069a
Richard I 307b, 3069a

Richard II, 3069a.
Richard III, 3069b
Richardson, Samuel, 3069b
Richelieu, Armand Jean Du-Plessis, 3070a.
Richelieu River, 3070a
Richmond, Ind., 3070a.
Richmond, Va., 3070b
Richter, Johann Paul Friedrich, 3072a
Rickets, 3072a
Riding, 3072b
Ridley, Nicholas 3072b
Ridpath, John Clark 3072b
Riel, Louis, 3073a, 3200a
Rienzi, Cola di, 3073b
Riesengebirge, 3073b
Rife, 3073b
Riga, Gulf of, 3074b
Riga, Livonia 3074b
Riggs Kate Douglas Wiggin, 3075a
Right, Petition of, 2804a
Right and Wrong, 1859a
Right of Search, 3242a
Right of Way 3075a
Rights, Bill of 432b
Rigsdag 1057b
Rile, Jacob Augustus, 3075a
Riley, James Whitcomb 3075b
Rims of the Ancient Mariner, 873b
Rinderpest, 3076a
Rinehart, Mary Roberts, 3076a
Ring, 3076a
Ring and the Book, The, 574b
Ring-Toss, 182a
Ringworm, 3076b
Rio de Janeiro, Brazil, 3077a
Rio de la Plata, 3077b
Rio Grande, 3078a
Rio Negro, 3078a
Riot, 3078a
Riparian Rights, 3078a
Ripley, George, 3077b
Rip Van Winkle, 1846a, 3078b
Ristori, Adelaide, 3078b
Rivers, 3078a
Riverside, Calif., 3080a
Riverside Drive, 2658a
River St., stems of North America, 2544b
Rives, Amelle, 3080b
Riviera, 3080b
Rival, José, 3080b
Road Rules, 3081a
Road Runner, 3080b
Roads, 3081a, 3082a
Roanoke, Va., 3082a
Roanoke River, 3082a
Roaring Forties 3087a
Roasting (cookery), 1069b
Robbery 3083a
Robert II, 3224a
Robbia (family), 3083b
Roberts, Charles George Douglas, 3083b
Roberts, Frederick Sleight, Earl Roberts, 3083b
Robertval, Sieur de, 658b
Robespierre, Maximilien Marie Isidore 3084a
Robin, 3084b
Robin Hood 1049b, 3085a.
Robin Hood and the Stranger, 2085a
Robinson Crusoe, 3085a, 3249b
Rob Roy, 3085a
Robsart, Amy, 3085a
Robson, Mount, 561a, 3089a
Robust Jacopo, 5544b
Roe 3085b
Rochambeau Jean Baptiste Donatien de Vimeure, 3085b
Rochester, Minn., 3085a
Rochester, N. Y., 3086a
Rock 1474a, 3086b
Rock-cork, 239b
Rockefeller, John D., 3087a, 3400a
Rockefeller Foundation, 3087a.

Rockefeller Institute for Medical Research, 3087b
Rockets, The 2150a, 3421a
Rockford, Ill., 3087b
Rock Hill, S. C., 3088a
Rock Island, Ill., 3088a
Rock of Ages, 1750b
Rock of Chickamauga, The, 1857b
Rock Salt, 3175b
Rocky Mountain National Park, 2742b
Rocky Mountain Parks, 885b, 2743b
Rocky Mountains, 3088b
Rocky Mountain White Goat, 3089b
Rodentia 3089b
Rodos, 3090a
Rodin, Auguste, 3090a
Roebuck, John Augustus, 3090b
Roebuck, 3091a
Roentgen, Wilhelm Konrad, 3091b
Roentgen Rays, 3091b
Rogers, Randolph 3092a
Rogers, Will, 3092a
Roland 3092a
Roland de la Platiere, Madame 3092b
Rolf, John 2875a, 3092b
Rolf, William James, 3092b
Roll Brimstone, 559a
Roller 3092b
Roller Books 3a
Roman Architecture, 164b
Roman Catholic Church, 3092a
Romance, 2815b, 3094a
Romance Languages 3094b, 3189b
Roman Consul, 925b
Romanesque Architecture 164b
Roman Mythology, 2448b
Roman Numerals, 3094b
Romanoff (dynasty), 3096a
Romans, Empire of the, 3095b
Romanism, 3095b
Roman Walls, 3095b
Roman Wormwood, 2938a
Rore 3096a
Rome, History of, 3099b
Rome, Ge., 2108a
Rome, Modern, 3098a
Rome N. Y., 3108a
Romeo and Juliet, 3106b
Romulus, 3099b, 3108b
Roof of the World, 3577b
Roof, 3108a
Roosevelt, The, 2602b
Roosevelt, Franklin D., 3108a.
Roosevelt Theodore, 2577b, 3108b
Roosevelt Dam 1842b
Root (mathematics), 3115b
Root, Ellhu 2577b, 3115b
Root, George Frederick, 3115b
Roots, 3116a
Rope, 3116a
Rorwer, Emma de, 647a
Rorqual, 3116b
Rosa, Monte, 2116b
Rosacea, 3116b
Rosamond, 3117a
Rosario Argentina, 3117a
Rosary 3117a
Rose, 3117b
Rose Bay, 2653b
Roseberg, Archibald Philip Primrose, 3117a
Rosenberg, William Starke, 3117b
Rose Family 322a, 3116b
Rosemary, 3118b
Rose of Jericho, 1857b
Rose of Sharon 1632a
Roses, Wars of the, 3118b

The letter a, after a number, indicates column 1; the letter b, column 2.

Rosetta Stone, 3119a
 Rose Window, 3119a
 Rosewood, 3119a
 Rosin, 3052b, 3119b
 Rosa, Alexander, 3119b
 Ross, Betsy, 3119b
 Ross, James Clark, 3119b
 Rossetti, Christina Georgina, 3120a
 Rossetti, Gabriel Charles Dante, 3120a
 Rossini, Gioacchino Antonio, 3120b
 Rosland, Edmond, 3120b
 Roswell, New Mex., 3120b
 Rot, 3121a
 Rotation of Crops, 3121a
 Rothschild (family), 3122a
 Rotterdam, Netherlands, 3122b
 Roubaix, France, 3122b
 Rouble, 3122a
 Rouen, France, 3122b
 Rouge, 3122a
 Rouget de Lisle, 2255b, 3123b
 Rouge et noir, 3123a
 Rough-on-Rats, 139b
 Rough Riders, 3110a, 3123b, 3375b, 3907a
 Roulette, 3123b
 Roumania, 3123a
 Roundheads, 3123b
 Round Table, 3124a
 Round Towers, 3124a
 Rousseau, Jean Jacques, 3124a
 Rowing, 3124b
 Rowland, Henry Augustus, 3124a
 Royal, Mount, 2405a
 Royal George, 3125a
 Royal Institution of Great Britain, 3125a
 Royal Northwest Mounted Police, 3125b
 Royal Society, The 3126a
 Royal Supremacy 3175b
 Rubaiyat, 1337a, 2657a
 Rubber, 2489b, 3125b
 Rubble Masonry, 2269b
 Rubellite, 3692b
 Rubens, Peter Paul, 2705b, 3125a
 Rubicon River 3125b
 Rubidium, 3125b
 Rubinstein, Anton Grigoryevitch, 3125b
 Ruble, 3125a
 Rubrics, 2246a
 Ruby, 461a, 3125a
 Rude, Francois, 3125a
 Ruff, 3125a
 Ruffo, Titti, 3125b
 Rugby School, 3125b
 Rugs, 3125b
 Ruksdael 3149a
 Rule of Three 2950a
 Rules of the Road, 3130b
 Rum, 3131a
 Rumania, 3131a
 Rumania in World War, 3922b
 Rumelia, 3132b
 Ruminants, 3133b
 Rump Parliament, 992a, 3134a
 Runes, 3134a
 Runjit Singh, 3134a
 Runnimead, 3134b
 Running Relay (game), 1441a
 Rupee, 3134b
 Rupert's Land, 3134b
 Rupture, 1677b
 Rural Credits 3134b
 Rural High Schools, 1685b
 Rurik, 3142a
 Rush, 3135b
 Ruskin, John, 3136a
 Russell, Annie, 3136a
 Russell, Bertrand, 3136b
 Russell, John, 3136b
 Russell, Lillian, 3137a

Russell, Sol Smith, 3137a
 Russell Sage Foundation, 3137b
 Russia, 3137b
 Russian Turkestan, 3648b
 Russo-Japanese War, 3146b
 Russo-Turkish War, 3147a
 Rust, 3147b
 Rusts, 3148a
 Ruth, 414a
 Ruth, Book of, 3148a
 Ruthenians, 3148a
 Rutile, 3148b
 Rutland, Vt., 3148b
 Rutledge, John, 3148b
 Ruwenzori, Mount, 3a
 Ruzsadal, Jacob van, 3149a
 Ryan, Abram Joseph, 3149a
 Rye, 3149a
 Rye House Plot, 3149b
 Ryswick, Treaty of, 3149b

S

S, 3150a
 Saar Coal Region, 1390a
 Sabbath, 3150a
 Sabbatical Year, 3150a
 Sabine River 3150b
 Sables, 3150b
 Sables Rape of the 3099b
 Sable, 3150b
 Sable Antelope, 317b
 Sable Island 3151a
 Sabotage, 3151a
 Sac, 3151b
 Saccharin, 3151b
 Sachs, Hans 3151b
 Sacramento, 3092a, 3151b
 Sacramento, Calif., 3152a
 Sacramento River, 3152b
 Sacred College, 3152b
 Sacred Groves, The, 2655b
 Sacred Way, 3096b
 Sacrifices, 3152b
 Saddle, 3153a
 Sadducees, 3153a
 Sadova, Battle of, 3153b
 S A D Formula, 1722a
 Safe, 3153b
 Safety Lamp, 1034a, 3153b
 Safety Matches, 2279b
 Safety Valve, 3154a
 Safflower, 3154a
 Saffron, 3154a
 Saifi, Ismail, 2795b
 Sagas, 2611a, 3154b
 Sages, 3154b
 Sage, Margaret Olivia Slocum, 3155a
 Sage, Russell, 3154b
 Sagebrush, 3155a
 Sagebrush State, 3155a
 Sage Grouse, 3155a
 Saghalien Island, 3170b
 Saginaw, Mich., 3155a
 Sagittarius, 3155b
 Sago, 3155b
 Saguenay River, 3156a
 Sahara Desert, 3156a
 Said Pasha, 1191b
 Saiga, 137a
 Saigon, Cochinchina 3157a
 Sailboat and Sailing 3157a
 Sailing Vessels, 3281b
 Saint Albans Battle of 3118b
 Saint Andrew's Cross, 994a
 Saint Augustine, Fla., 3158b
 Saint Bartholomew, Massacre of, 348a
 Saint Bernard, Grant 3158b
 Saint Bernard Dog, 3158b
 Saint Basil Order of, 275b
 Saint Boniface Man., 3159a
 Saint Catharine's Ont. 3159a
 Saint Charles Mo., 3159b
 Saint Christopher (Island), 3159b
 Saint Clair, Arthur 3159b
 Saint Clair, Lake, 3159a
 Saint Cloud, Minn., 3160a
 Saint Croix Island, 3620b
 Saint Elias Mountains, 3160a
 Saint Elmo's Fire, 3160b
 Saint Etienne, France, 3160b
 Saint Francis Xavier, 3956a
 Saint Gaudens, Augustus, 3160b, 3236a
 Saint George, 1409b
 Saint George, Order of, 2671a
 Saint George and the Dragon, 3161a
 Saint George's Channel, 3161a
 Saint Gotthard, 3161b
 Saint Helena Island, 3161b
 Saint Hyacinthe, Que., 3161b
 Saint John, Que., 3162b
 Saint John, N. B., 3162a
 Saint John of Jerusalem, Knights of, 1899b
 Saint John River, 3162a
 Saint John's, Newfoundland, 3162a
 Saint John's River (Fla.), 3162b
 Saint Joseph, Mo., 3162b
 Saint Kitts, 3162b, 3621a
 Saint Lawrence, Gulf of, 3163a
 Saint Lawrence Canals, 678b
 Saint Lawrence Islands Park, 2743a
 Saint Lawrence River, 3163a
 Saint Leger, Barry, 3163b
 Saint Louis, Mo., 3164a
 Saint Lucia Island, 3621b
 Saint Mark, Cathedral of, 3164a
 Saint Mary's Canal 3202b
 Saint Mary's River, 3165b
 Saint Maurice River, 3165b
 Saint Nicholas, a Visit from, 2020a
 Saint Paul, 3167a
 Saint Paul de Loanda, Angola, 3167b
 Saint Paul's Cathedral 3168b
 Saint Petersburg, Fla., 3168a
 Saint Petersburg, Russia, 2604b, 3169a
 Saint Peter's Canal, 679b
 Saint Peter's Church, 3169a
 Saint Quentin France, 3169b
 Saint-Saens, Charles Camille, 3169b
 Saint Sophia, Church of, 3169b
 Saint Thomas, Ont., 3170a
 Saint Thomas Island, 3170a
 Saint Ursula, 3172a
 Saint Ursula, Nuns of 3172a
 Saint Valentine, 3172b
 Saint Veronica, 3172b
 Saint Vincent 3170b
 Saint Vitus's Dance 3170b
 Sainte Anne de Beaupre, Quebec, 3169a
 Sakhalin Island, 3147a
 Saladin, 997b, 1191a, 3171a
 Salamander, 3171a
 Salamis, 3171b
 Sal Ammoniac 3171b
 Salary, Grab, 3171b
 Salayer Islands, 3171b
 Sale, 348a
 Sale, Bill of, 432b
 Salem, Mass., 3171b
 Salem, Ohio, 3172a
 Salem, Ore., 3172b
 Saloyer Islands, 3171b
 Salic Law, 3172b
 Salicylic Acid, 3173a
 Salisbury, Kans., 3173a
 Salisbury, N. C., 3173a
 Salisbury, Robert Arthur Talbot Gascoigne Cecil, 3173a
 Saliva, 3173b
 Salust, 3173b
 Salmon, 3174a, 3809b
 Salol, 3174a
 Salome, 3175a
 Salon, The Paris, 3175a

Saloniki, Greece, 3175a
 Salafy, 2695a, 2697a
 Salt, 3175b
 Saltillo, Mex, 3177a
 Salt Lake City, Utah, 3177b, 3172a
 Salt Lakes 1468a
 Salt Sea, 1097a
 Salton Sea, 3178a
 Saltpetre, 3178b
 Salts, Smelling, 3178b
 Salutations, 3178b
 Salvador, 3178b
 Salvation Army, 3179b
 Salvini, Tommaso, 3180b
 Samaria, 3180b
 Samaritans, 3180b
 Samarkand, Russian Turkestan, 3181a
 Samen Mountains, 9b
 Samnites 3181a
 Samos, 3181a
 Samos, 30a, 3181b
 Sampson, William Thomas, 3181b
 Sam Slick, 1614b
 Samson, 3182a
 Samson Agonistes, 3182a
 Samson and Delilah, 3182b
 Samuel, 3182b
 Samuel, Books of, 3182b
 Samur, 3182b
 San Angelo, Tex, 3182b
 San Antonio, Tex, 3182b, 3552a
 San Bernardino, Calif, 3183b
 San Diego, Calif, 3184b
 San Domingo, 3182a
 Sand, 3183b
 Sand, George, 3183b
 Sandalwood, 3184a
 Sand Bar, 3184a
 Sand Bel, 3184a
 Sandpiper, 3184a
 Sand Lance, 3184a
 Sandpaper, 3184b
 Sandpiper, 3185a
 Sandstone, 3185a
 Sand Table, 1978b
 Sandusky, Ohio, 3185a
 Sandwich Islands, 1643a
 Sandy Hook, 3185b
 San Francisco, Calif, 3185b
 San Francisco River, 3187a
 Sanhedrin 3187b
 Sanitary Science, 3187b
 Sanitation, 1101a
 San Jacinto, Battle of, 3183a, 3187b
 San Joaquin River 3185a
 San Jose, Calif, 3182a
 San Jose, Costa Rica 3185a
 San Jose, Costa Rica 3185a
 San Juan, Porto Rico 3185b
 Sankey, Ira David 3185b
 San Luis Park 3085b
 San Luis Potosi, Mex, 3185a
 San Marino, Republic of 3185a
 San Martin, 3185a
 San Miguel de Tucuman Argentina 3182a
 San Salvador, Central America, 3185b
 Sanskrit Language and Literature, 3185b
 Santa Ana, Calif, 3189a
 Santa Anna, Antonio Lopez de, 3189a
 Santa Barbara, Calif, 3190a
 Santa Claus, 2570a
 Santa Cruz, Calif, 3190b
 Santa Fe, Argentina 3190b
 Santa Fe N. M. 3191a
 Santayana, George, 3191a
 Santiago, Chile 3191b
 Santiago, Battle of 3191b
 Santiago de Cuba, Cuba, 3192a
 Santo Domingo, 3192a
 Santos, Brazil, 3192b
 Santos-Dumont, Alberto, 1362a, 3192a

Saone River, 3193a
 Sao Paulo, Brazil, 3193a
 Sap, 3193b
 Sapajou, 3193b
 Sapphire 361a, 3193b
 Sappho, 3194a
 Saprokites, 314a
 Sap-sucker, 1346b, 3194a, 3009a
 Sapulpa, Okla, 3194b
 Saracens, 1191a, 3194b
 Saragossa, Spain, 3194b
 Sarajevo, 3196a
 Saratoga, Battles of, 3195b, 3196a
 Saratoga Springs, N. Y., 3195b
 Saratov, Russia, 3195b
 Sarcocolla, 3432a
 Sarcophagus, 376a, 3195b
 Sard, 3196a
 Sardanapalus, 357a, 3196a
 Sardine, 3196a
 Sardinia, 3196a
 Sardinia, Kingdom of, 3196b
 Sarcophy, 461a, 3196b, 3197a
 Sardon, Victorien, 3197a
 Sargasso Sea, 3197a
 Sargent, John Singer, 3197a
 Sargon II, 361a, 311b
 Sarnia, Ont, 3197b
 Sarpedon, 3197b
 Sarsaparilla, 3197b
 Sarto, Andrea del, 3704b, 3197b
 Sartor Resartus, 705b
 Saskatchew, 3188a
 Saskatchew, Rebellions, 3200a
 Saskatchewan River, 3200b
 Saskatoon, Sask, 3200b
 Sassafraz 3201a
 Sassen 1066a
 Satellite 3201a
 Satin, 3201a
 Satire 3201b
 Saturday, 3201b
 Saturn (mythology), 3201b
 Saturn (planet), 3201b
 Saturnalia 3202a
 Satyr, 3202a
 Sauger, 2565a
 Sault Indians, 3151b
 Sault 2768a 3202a
 Sault Sainte Marie, Mich, 3202b
 Sault Sainte Marie Ont, 3202a
 Sault Sainte Marie Canal, 3202b
 Saunders, Margaret Marshall 3203a
 Sausage, 3203b
 Savannah (ship) 3202b
 Savannah, Ga, 3203b
 Savannah River, 3204b
 Saving and Spending, 3572a
 Savings Bank 3204b
 Savings Bank, Canadian, 3205b
 Savonarola, Girolamo 3205b
 Savoy, House of, 3206a
 Saw, 3206a
 Sawfish, 3206b
 Saw Fly, 3207a
 Saxe, John Godfrey, 3207a
 Saxifrage 3207a, 3208b
 Saxony, 3207a
 Saxony, Kingdom of, 3207b
 Saxophone 3208a
 Sables, 2238a
 Scalds, 3216a
 Scale insect, 3208b
 Scales (music), 2440a 3208a
 Scales (zoology), 3208b
 Scallop 3208b
 Scald, The 3208b
 Scammony 3209a
 Scandinavia, 3209a
 Scandinavian Mythology, 3461b
 Scone, 3209a
 Scapula, 3217b
 Scarab, 3209a
 Scarification, 3620a

Scarlet Fever, 785a, 3209b
 Scarlet Letter, The, 1647a
 Scheidt River, 3210a
 Schenectady, N. Y., 3210a
 Schiller, Johann Friedrich, 3210a, 3211a
 Schist, 465b
 Schleswig-Holstein, 3211a
 Schley, Winfield Scott, 3211b
 Schleyer, Johann Martin, 3211b
 Schmalckalden League, 3212a
 Schoffer, Peter, 1592a
 Schodde, John McAllister, 3212a
 Scholasticism, 3212b
 School, Evening, 1280a
 School, Parochial, 2749b
 School, Vacation, 3212a
 School District 3212b
 School Gardens, 1444b, 3212b
 School Savings Banks, 3205a
 Schopenhauer, Arthur, 3214b
 Schott, 3603a
 Schottelach, 1025a
 Schubert, Franz, 3215a
 Schuckburgh, Richard 3200a
 Schumann, Robert, 3215b
 Schumann-Klein, Ernestine, 3215b
 Schurman, Jacob Gould, 3214a
 Schurz, Carl, 3216a
 Schuyler, Philip 3216b
 Schuykill River, 3216b
 Schwab, Charles M., 3216b
 Schwatka Frederick, 3217a
 Sclatona, 3217a
 Scilly Islands 3217b
 Scipio Africanus, 3217b
 Scipio, Publius Cornelius Aemilianus, 3218a
 Scissorbill 3218a
 Scleropsis, 3218b
 Sclerotic 3218b
 Scopes 3218b
 Scorpion, 3218b
 Scorpion, 3218b
 Scorpion Fly, 3219a
 Scotch, 3220a
 Scotch Terrier, 3219a
 Scotch Verdict, 3219a
 Scotia, 3220a
 Scotland, 3219b
 Scotland Yard, 3225b
 Scots 3220a
 Scott, Hugh Lenox 3226a
 Scott, Robert Falcon, 3226a, 3227a
 Scott, Thomas 3073a
 Scott, Walter, 2b, 3025b, 3226b
 Scott, Winfield 3227b
 Scott, Antonio 3227b
 Scottish Chiefs, 2999a
 Scouring Rush, 1722b, 1723a
 Scranton Pa, 3227b
 Scrap-Books (Kindergarten), 1978b
 Scrap-Books (primary dept) 1978b
 Screw, 3228a
 Screw Pine 3228b
 Screw Propeller, 1823a
 Scribe, Augustin Eugene, 3229a
 Scrofula, 3229a
 Scruple, 3229a
 Sculpture, 3229a
 Sculpture 3229b
 Sculpture American, 3700a
 Scoury, 3228b
 Scutellaria, 3228b
 Scutum, 323a
 Seylla and Charybdis 2238a
 Sea 3631a
 Sea Anemone 3239a

The letter a, after a number, indicates column 1; the letter b, column 2

- Sea Bear 3240b
 Sea Blubber, 1886b.
 Sea Cow, 2233b
 Sea Cucumber, 3239a.
 Sea Devil, 126a.
 Sea Horse, 1689a.
 Sea-Island Cotton, 969a.
 Sea Islands, 3239b
 Sea Kale, 3239b
 Seal (animal), 3240a
 Seal (mark), 3241b
 Sealing Wax, 3241b
 Sea Lilies, 3239b
 Sea Lion, 3241b
 Sea Necklaces, 907b
 Sea Nettles, 1886b
 Sea Onion, 3395b
 Sea Otter, 2691a
 Sea Raven, 3239a
 Search, Right of 3242a.
 Search Warrant, 1806a.
 Sea Robin, 1695b
 Sea Serpent, 3242a
 Seasickness, 3242a
 Sea-snipe, 324a
 Seasons, 3242b
 Sea Squirrels, 3242b
 Seattle, Wash., 3243a.
 Seat Work, 1978a
 Sea Unicorn, 2475a
 Sea Urchin, 3244a.
 Sea Weed, 3244b
 Sebaceous Glands, 1519a,
 1519b.
 Sebastian, Saint, 3244b
 Sebastopol, Crimea, 3244b
 Secession, 3244b
 Secession in America, 3710b
 Secondary Colors, 885a
 Secondary Schools, 3214b
 Second Lieutenant, 2099a.
 Secord, Laura, 3245a
 Secret Societies, 1404b
 Secretary Bird, 3245a
 Secretary of State, 3410a
 Secretary of the Treasury,
 3623b
 Secretary of War, 325b
 Section, 3245a
 Secret Service, 3245b
 Section, Division of a, 2013b
 Secular Games 3245b
 Sedalia, Mo., 3245b
 Sedan, Battle of, 3246a.
 Sedative 3246a
 Sedges, 3246a
 Sedimentary Rocks, 1474a.
 Seed, 2490b 3247a
 Seed Dispersal, 3246b
 Seeder, 3369a
 Seedless Apples 150a
 Seed Testing, 3245a
 Seeger, Alan 3248a
 Selditch Powder, 3248b
 Seigniorage, 3248b
 Seine 3248a
 Selamograph, 3248a
 Selections for Memorizing,
 2124a
 Selene, 1225a, 3249a
 Selenium, 3249a
 Seleniureted Hydrogen, 3249b
 Selenious Nicator 140b
 Self-Activity, 2767a
 Self-Denying Ordinance, 992a,
 249b
 Self-Dependence, 3273b
 Self-Expression, 787b
 Self-Reliance, 1263a
 Self-Respect, 787b
 Self-Restraint, 1262b
 Seljuks, 3249b
 Selkirk, Alexander, 1911b,
 3085a, 3249b
 Selkirk Mountains, 3250a
 Selma, Ala 3250a
 Selva, 858b
 Selvas, 3250a
 Semaphore 3250a
 Sembrich Marcella, 3250b
 Semele, 3250b
 Seminole, 3251a
 Semiramis, 256b, 3251a.
 Semiramis of the North, 3251a
 Semitic Group of Languages,
 3251b
 Semites, 3251a.
 Semitic Language, 3251b
 Semmes, Raphael, 3251b
 Senate, 3251b
 Senate (Canada), 2744a
 Senate of the United States,
 3252a
 Seneca, Lucius Annaeus, 3252b
 Seneca Indians, 3252b
 Seneca Lake, 3252b
 Senegal, 3253a
 Senegal River, 3253b
 Senegambia, 3253a.
 Sennacherib 311b, 3253a
 Sensation, 3253a
 Sense Games 1955b
 Senses, 3251b, 3254a
 Sensitive Plant, 3254b
 Sensory Nerves, 3508b
 Sensuous Feelings, 1306a
 Sentence, The Simple, 2047b
 Sentimental Journey, 3422a
 Seoul, Chosen, 3254b
 Sepal, 1454a
 Separatists, 2653a
 Separator Cream, 983b
 Sepia, 3254b
 Sepoy, 3254b
 Sepoy Rebellion, 731b, 1784a,
 3255a
 Seppuku, 1627a
 Seraph, 3255a
 Seraphim Act, 1562a
 Septimius Severus, Arch of,
 3255b
 Septuagint, 1894b, 3256a
 Septum, 1656a
 Sequoia, 3256a
 Sequoia National Park, 2742b
 Sequoyah, 107a, 169b
 Seraglio, 3256b
 Serajevo, Bosnia, 3195a
 Serapis, The, 499a, 8057a,
 3257a
 Serbia, 3257a.
 Seris 3259a
 Sergeant, 3259a
 Sergeant-at-Arms, 3259a
 Serinagar, Kashmir, 3259a
 Serous Membranes, 3259b
 Serpent, 3330b
 Serpent Charming, 3259b
 Serpentine, 3259b
 Serum Therapy, 3259b
 Serval 3260a
 Servetus Michael 647b 3260a
 Service, Robert William, 3260b
 Servius Tullius, 3260b
 Sesame Grass, 1436b
 Seti I, 1190b, 3260b
 Seton, Ernest Thompson, 536b,
 3261a
 Setter, 3261a.
 Seul, Chosen, 3254b
 Seven Lamps of Architecture,
 The, 3136a
 Seven Modern Wonders of the
 World, 3262a
 Seven Fines, Battle of, 1294a
 Seven Sleepers, 3261b
 Seventeen-year Locust, 819b
 Seventh Day Adventists, 3261b
 Seven Times One, 2021a
 Seven Weeks' War, 3153b,
 3261b
 Seven Wise Men of Greece,
 3262a
 Seven Wonders of the World,
 3262a
 Seven Years' War 3262a.
 Severn River, 3262a.
 Severus, Lucius Septimius,
 3262a.
 Seville, Spain 3262a
 Sevres Porcelain, 3263b
 Sewerage 2874b, 3264a
 Seward, William Henry, 3264b
 Sewing Machine, 1823a, 3266a
 Sextant, 3265b
 Seymour, Jane, 1672a.
 Shackleton, Ernest, 3265b,
 3267b
 Shad, 3266a.
 Shadblow, 3266b
 Shaddock, 1554b
 Shad Fly, 3264b
 Shadow, 2102b
 Shafter, William Rufus, 3266b
 Shaftesbury, Anthony Ashley
 Cooper, 3266b
 Shagreen, 3266b
 Shah, 345b
 Shah Jehan, 3267a.
 Shakers, 3267a
 Shakespear, William, 3267b
 Shaking Quakers, 3267a
 Shale, 3270b
 Shaler, Nathaniel Southgate,
 3270b
 Shamanism, 3271a
 Shamokin, Pa., 3271a.
 Shamrock, 3271a
 Shanghai, China, 3271a.
 Shannon, The, 3804a
 Shannon River, 3271b
 Shantung, 3271b
 Shark, 3272a.
 Sharon, Pa., 3272b
 Sharps and Flats, 2441a.
 Shasta, Mount, 640b, 3276b
 Shasta Daisy, 1021b
 Shat-el-Arab River, 1268a.
 Shaw, Albert, 3272b
 Shaw, Anna, 3274a.
 Shaw, George Bernard, 3278a.
 Shawnee, Okla., 3273b
 Shawnee Indians, 3273b
 Shaw's Garden, 3164b
 Shays, Daniel, 3273b
 Shays' Rebellion, 3273b
 Sheboygan Wis., 3273b
 Sheep 3273b
 Sheep Laurel 1923b, 1924a.
 Sheepshead 3275a
 Sheffield, Eng., 3275a.
 Shelf, 3275a.
 Shells 3275a
 Shelbyville, Ind., 3275b
 Shelds, Charles Monroe,
 3275b
 Shell, 3276a.
 Shell (zoology), 3275b
 Shelley, Percy Bysshe, 3276a.
 Shenandoah, Pa., 3277a
 Shenandoah River, 3277a
 Sheol, 1666a
 Shepard, Finley J., 3277a
 Shepard, Helen Gould, 3277a.
 Shepherd Dog, 3277a.
 Shepherd Kings, 1190b
 Sheraton, Thomas, 1427b,
 3277b
 Sherbrooke, Que., 3277b
 Shere Ali, 1794b
 Sheridan, Philip Henry, 3277b
 Sheridan, Richard Brinsley
 Butler, 3278a
 Sheridan, Wyo., 3277b
 Sheriff, 3278a
 Sherman, James S., 3499b
 Sherman, John, 3278b
 Sherman, Roger 3278b
 Sherman, Tex., 3278a
 Sherman, William Tecumseh,
 3278a
 Sherman Anti-Trust Law,
 3424a
 Sherman Silver Purchase Act,
 2713a
 Sherry, 3279b
 She Stops to Conquer, 1533b
 Shetland Islands, 3279b
 Shield, 3280a
 Shiloh, 3280a
 Shillaber, Benjamin Penhallow
 3280a
 Shilling, 3280b
 Shiloh, 3280b
 Shiloh, Battle of, 3280b
 Shingles, 3281a.

The letter a. after a number, indicates column 1; the letter b, column 2.

Shinney, 1708b
Shintlem, 3281a.
Ship, 2281b.
Ship Broker, 569a
Shiraz, Persia, 3286b
Shittim Wood, 3286b
Shoddy, 23a, 3287a
Shoes, 568a
Shoeating Republic, 793b
Shogun, 1977a 2287a
Sholes, Charles L. 1232a.
Shooting Star, 3210b
Short Ballot, 3287a
Shorthand, 2850a, 3287b
Shorthorns, 728b
Short-tailed Field Mouse, 4789a
Shoshonean Indians, 3288b
Shoshone Falls, 3288b
Shoshone River, 3331a.
Shot, 3288b
Shotgun, 3229a
Shot Put, 774a, 3289a
Shovelboard, 3291a
Shoveler, 1150a, 3289b
Shrapnel, 3289b
Shrapnel Henry, 3290a
Shreveport, La., 3290a.
Shrew, 3290a
Shrew Mole 3290b
Shrike, 3290b
Shrimp, 3291a
Shrove Tuesday, 2250b, 3291a
3843b
Shuffleboard, 3291a
Shuster, W. Morgan, 2796a
Shwanpan 2a
Shin 3291b
Siberia, 3293a
Sibyl, 3295b
Sibylline Books 3295b
Sicilian Vespers, 3295b
Sicilies, Kingdom of the Two, 3296a
Sicily, 3296b
Sickle, 3297a.
Siddons Sarah Kemble, 3297a.
Sideron Month 3404b
Sideron, Tim 3297b
Siderite 3297b
Sidney, Philip, 3297b
Sidney 3297b
Siding 3297a
Sieg, 3298a.
Sienkiewicz, Henryk, 3298a
Sierra, Leone, 3298b
Sierra Madre Mountains, 3298b
Sierra Nevada Mountains, 3298b, 3298a.
Sierras 3297b
Sigel, Franz, 3299a
Sigh, Bridge of, 557b
Sight, 3789a
Sigmund, 3289b, 3299b
Sigma XI 3299b
Signal Corps, 328a, 3299b
Signaling, 3200b
Sign Language, 3201b
Sigbee, Charles D., 3202a.
Sigrud, 3202a.
Sikhs 1780b 3202b
Si Kiang River, 3202b
Silage 3207b
Siles Marguer 1213b, 3209b
Silence, Towers of, 3604a
Silesia, 3202b
Silica 3203a
Silicon 1202b
Silk, 3203b
Silk, Artificial 3206a.
Silkworm, 3202b
Silkworm Gut 3205b
Siloam Pool of, 3205b
Silo and Silage 3206b 3207b
Silurian Period 3207b
Silver, 3208a 3278a.
Silver Certificates, 3286a
River State, 2118a.
Simcoe, John Graves 3209b
Similarity, Law of 3286a.
Smile, 3221a 3209b
Simonides, 31b, 3209b

Simon Peter, 2202a
Simons, Menno, 3298b
Simops, 3217a
Simpson Pass, 3210a
Simpson Tunnel, 3210a
Simpson, James Y., 128b, 209b
3210a.
Sinai, William Sowden, 3210b
Sinai, Mount, 3210b
Sinclair, Upton, 3210b
Sindia, 3211a
Sinding, Christian, 3211a
Sintapore, 3211a
Singing, 3211a
Single Tax, 3212b
Sing Sing, N. Y. 2685b
Sian Feib, 1564b, 1824b 3212b
Sinusoidal Current, 1209a
Sioux Indians, 3212b
Siout, Upper Egypt, 3215a.
Sioux City, Iowa 3213a
Sioux Falls, S. D. 3213b
Sioux Indians, 3213a
Siouxon, 3213b
Sir (title), 3214a
Siren, 3214a
Sir Galahad 8547a
Sirius, 1089a 3214a
Sirius, 4214b
Sir Roger de Coverley 23b
Sir Tristram 3223a.
Sisal, 433a 3214b
Sisters of Charity, 751b
Sisters of Mercy 3205b
Sistine Chapel, 3214b
Sistine Madonna, 770a, 2215a, 2705a 3209b
Sisyphus 3215a
Sita, Alasia, 3215a
Sitting Bull, 3215a.
Siut, Upper Egypt, 3215a
Siva 3215b
Six Nations, The 1298a
Six Per Cent Method 1215b
Sixtus (Pope), 3215b
Skagerrak, 3215b
Skagway, Alaska, 3216a
Scales 3210b, 3216a
Skat, 3216a
Skate 3216a
Skates and Skating 3216b
Skat, Walter William 3216b
Skea, 3216a
Skeena River, 501b
Skeleton, The 3217a
Skepticism 3219a
Ski, 3219a
Skimmer 3218a.
Skin, 3219a
Skin Grafting, 3219b
Skink 3219b
Skinner, Otis 3220a
Skip Jack 324b
Skull, 3217a.
Skunk 3220a.
Skupstina 3228a
Skye, Island of 3220b
Skyark, 2060b
Sky Terrier, 3220b
Sky-scraper, 162b
Slag 3220b
Slender, 3094a, 3220b
Slane, 3221a.
Slane 3221a.
State Fencibles, 2772a.
Slavery, 3221b
Slavery in the United States 3221b
32710a
Slavonia, 322a
Slavs 3223b
Sleep 3223a
Sleeping Beauty, 2791a
Sleeping Cars 3200a
Sleeping Sickness, 3223a
3642a.
Sleeplessness 1212a
Sleepwalking, 3245a.
Sleight, John, 3223b, 3621b
Slime Molds, 3223b
Slings 3223b
Slipperwort, 626a.

Sloe 3224a
Sloth, 3224a
Sloth Machine, 3224b
Slovakia, 3224b
Slovenians, 3225a.
Slovy System, 2245a, 3225a
Slugs, 3225a
Small Circle, 3225b
Small-Pox, 762a, 1866b, 3225a
Smell, 2243a, 3225a
Smelling Salts, 1778b, 3225b
Smeit, 3226a
Smelt, 3226a
Smell, Friedrich, 3226a
Smell, 3226a
Smiles, Samuel, 3226a
Smith, Adam, 3226b
Smith, Edmund Kirby, 3226b
Smith, Francis Hopkinson, 3226b
Smith, Goldwin, 3227a
Smith, Hyram 3213b
Smith, John 2876a, 3227a
Smith, Joseph, 1418a, 3227b
Smith, Samuel, 110a, 3227b
Smith, Sophia 3228a
Smith, Sydney 3227b
Smith College, 3228a
Smith-Hughes Act, 1666a
Smith, P. C. 3228a
Smithson, James, 3228b
Smithsonian Institution, 3228a
Smoke, 3228b
Smokeless Powder, 3229a
Smollett, Tobias George, 3229a
Smoot, Road 3229b
Smuts, Jan Christian, 3229b
Smuts 3229b
Smyna, 3230a
Small 3230b, 3230a.
Snake, 3230b
Snake Bird 1040a, 3230b
Snake Charming 3230b
Snake Dance, 1717b
Snake Indians, 3230b
Snake Killer 3231a
Snake River, 3231a.
Snap Dragon, 3231a
Snapping Turtle, 3230a 3231a.
Snipe 3231b
Snoring, 3231b
Snorra Edda, 2611a
Snorri Sturluson 3231b
Snout Beetle, 1028b
Snow, 1460b, 3232a.
Snowball 3232b
Snowberry, 3232b
Snowbird, 3232b
Snowbound, 3232a
Snowbunting 3232b
Snowdrop 3232b
Snow Leopard 2691b
Snow Line 3232b
Snowplow, 3232b
Snowshoe, 3232b
Snowstorm in the Country, 3232a
Snowy Heron, 1879a
Snuff, 3232a
Snuff, 3232a
Snuff, 3232a
Soapstone, 3234a.
Soccer Football 1871b
Social Democrats, 3234a
Socialism, 1824b
Socialist Party, 2691a
Social Settlements 3235b
Society for the Prevention of Cruelty to Animals 3235b
Society Islands, Archipelago 3235a
Society of Friends 2978a
Society of Jesus, 1890b
Sociology, 3235b
Socrates, 3235a
Soda 3237a.
Soda Ash 3237b
Soda Water, 3237b
Sodium, 3237b
Sodium Bicarbonate, 3237b
Sodom 3238a
Sodom, Apples of, 3238a
Soerabaya, Java 3237b
Sofia Bulgaria, 3238a

The letter a, after a number, indicates column 1; the letter b, column 2.

- Soft Palate, 541b, 2711b
 Soft-shelled Turtle, 3080a
 Sohn, 2467b
 Soil, 3338b
 Soils, Bureau of, 51a.
 Soil Water, 3388a
 Soissons, France, 3340b
 Sokoto, Nigeria, 3340b
 Solanum, 2678a, 3340b
 Solar Engine, 3340b
 Solar Microscope, 3341a
 Solar Plexus, 2510a
 Solar Spectrum, 2103a
 Solar System, 3341a
 Soldiers, 3341b
 Soldiers' and Sailors' Insurance, 1918a
 Sole, 3342a
 Solemn League and Covenant, 977a
 Solicitor, 3342a
 Solid, 3342b
 Solidification, 2294b
 Solitaire, 3342b
 Solomon, 3342b
 Solomon Islands, 3343a
 Solomon's Song, 3343a
 Solomon's Temple, 2537a
 Solon, 3343a
 Solstice, 1469a, 3343b
 Solution, 3343b
 Solvent, 3343b
 Solway Firth, 3344a
 Solymann II, 3344a
 Somali Coast, 3344b
 Somaliland, 3344a
 Somers Islands, 338b
 Somerville, Mass., 3344b
 Somme, Battles of the, 3345a, 3321b
 Sonme River, 2345a
 Sonnambulum, 3345a
 Sonnius, 3345b
 Sonnia, 3345b
 Song of Songs, 3343a
 Song of the Lark, 552a
 Sonnet, 3345b
 Sons of Daniel Boone, 536b
 Sons of Liberty, 3346a
 Sons of Veterans, 3346a
 Soot, 3346b
 Sophia, Church of Saint, 3169b
 Sophia, Bulgaria, 3338a
 Sophists, 3346b
 Sophocles, 3346b
 Soprano, 3311b
 Sorbonne, 3347a
 Sorel Que, 3347a
 Sorghum, 3347b, 3465a.
 Sorority, 3347b
 Sorrel, 3347b
 Sorrel Tree, 3347b
 Sothern, Edward H., 3348a
 Soudan, 2466b
 Soul, 3348a
 Sound, 3348a
 Sounding, 3349a
 Sounds, Classification of, 2681b
 Soup-making, 1100b
 Sour Gum, 431b
 Sousa, John Philip, 3349b
 South African War, 3349b
 South America, 3350b
 South-American Washington, 490b
 Southampton, Eng., 3356b
 South Australia, 3358a
 South Bend Ind., 3358b
 South Bethlehem, Pa., 3358b
 South Carolina, 3358a
 South Carolina, University of, 3362a
 South Dakota, 3362b
 South Dakota, University of, 3365b
 Southern Cross, 3366a
 Southern Ocean, 1265b
 Southey, Robert, 3368a
 South Island, N. Z., 2563a.
 South Mountain, Battle of, 3368a.
 South Orange, N. J., 2568a
 South Polar Exploration, 3368b
 South Sea Company, 3368b
 Sovereign, 3368b
 Sovereign of the Seas, 3382a
 Sovereignty, 3368b
 Soviet, 3330a, 3369a
 Sowing Machine, 3369a
 Sow Thistle, 3369b
 Soy Bean, 367b, 3369b
 Spaghetti, 2197a
 Spain, 3870a
 Spanish, 1089b, 3374b
 Spanish-American War, 3376a, 3371b
 Spanish Colonies, 853a
 Spanish Influenza, 1801a
 Spanish Succession, War of the, 3458b
 Spar Buoy, 602a
 Sparring, 3378a
 Sparrow, 3378a
 Sparrow Hawk, 3378b
 Sparta, 3378b
 Spartans, 3377b
 Spartacus, 3377b
 Spartanburg, S. C., 3378a
 Spasm, 3378a
 Spathe Ore, 1337b
 Spavin, 3378a
 Spawn, 3378a
 Speaker, 3378b
 Spearmint, 3378b
 Special Henses, 3354a
 Specie Circular, 1864a, 2726b
 Specie Payments, Resumption of, 3378a
 Species, 3378a
 Specific Gravity, 1556a
 Specific Gravity Unit of, 2670b
 Specific Heat, 3364a
 Spectacle Snake, 868b
 Spectacles, 3378a
 Spectator, The, 25b
 Spectroscope, 3379b
 Spectrum, 2101a, 2103a
 Spectrum Analysis, 3380a
 Specular Metal, 576a
 Specular Iron Ore, 1357a
 Speech, 3380b
 Speedometer, 3380b
 Speedwell, 2344b, 2576a
 Spelling, 3380b
 Spelter, 3377b
 Spencer, Herbert, 3381b
 Spencer Gulf, 3382b
 Spenser, Edmund, 3382b
 Spennett, 3383a, 3384b
 Spermatophytes, 3383a
 Sperm Oil, 3383a
 Sperm Whale, 3383a
 Sphere, 209b, 3383a
 Spheroid, 3383b
 Sphinx, 3383b
 Sphinx Moth, 3383b
 Sphygmograph, 3383b
 Spice, 3384a
 Spice Islands, 3381b
 Spider, 3384a
 Spider, Trapdoor, 3611a
 Spider Web, 2488b, 3384b
 Spiegellein, 3418b
 Spikenard, 3385a
 Spinach, 3385b
 Spinal Cord, 2508a, 3385b
 Spineless Cactus, 629a
 Spinneret, 3304a
 Spinning, 3385b
 Spinning Jenny, 218b, 1628b, 3386a
 Spinning Wheel, 3386a
 Spinoza, Baruch Benedict, 3386b
 Spiny Ant-eater, 1172b
 Spirea, 3386b
 Spire, 2387a
 Spirlum, 114b
 Spirits of Turpentine, 3055a
 Spirits of Wine, 76a.
 Spiritualism, 3387a.
 Spirometer, 3387b
 Spithead, 3387b
 Spitz, 3387b
 Spitzbergen Islands, 3388a.
 Spisen, 5b, 3388a
 Splicing, 3388a
 Spofford, Ainsworth Rand, 3388b
 Spokane, Wash., 3388b
 Sponge, 3388b
 Spontaneous Combustion, 337a, 3390a
 Spontaneous Generation, 3390a
 Spoonbill, 3289b, 3390b
 Spore, 3390b
 Spotted Fever, 2663b
 Spottiswood, Lady John Scott, 129b
 Spottsylvania Court House, 3390b
 Sprain, 3391a
 Sprat, 3391a
 Spring (astronomy), 3391b
 Spring (physics), 3391b
 Spring, Mineral, 2345a
 Springbok, 3392a
 Springer, 158a
 Springfield, Ill., 3392a
 Springfield, Mass., 3392b
 Springfield, Mo., 3392a
 Springfield, Ohio, 3392b
 Springing Beetle, 854b
 Spruce, 3393b
 Spurge Family, 3394a
 Spurgeon, Charles Haddon, 3394a
 Spy, 3394b
 Squad, 339b
 Squadron, 3394b
 Square, 3395a
 Square Measure, 2315a, 3395a
 Square Root, 206b
 Squash, 3395a
 Squash Bug, 3395b
 Squatter Sovereignty, 108a, 3395b
 Squid, 3395b
 Squill, 3395b
 Squinting, 3396a
 Squirrel, 3396a
 Squirrel Game, 1439a
 Srinagar, Kashmir, 3396a
 Stabbe, Mater, 1187b, 1320b, 3396b
 Stabiae Vesuvius, 3397a
 Stable, 1020b
 Stadium, 3397b
 Stadtholder, 3397a
 Stael, Madame de, 3397a
 Staff, 3397b
 Stag, 3397b
 Stag Beetle, 3398a
 Staggerbush, 1924a
 Staghound, 3398a
 Stained Glass, 3398a
 Staked Plain, 3449b
 Stalactite, 3398b
 Stalagmite, 3398b
 Stamen, 518a, 1354a
 Stamford, Conn., 3398b
 Stammering, 3399a
 Stamp, 3399a
 Stamp Act, 3399a
 Stamp Weed, 1791a
 Standard Oil Company, 3399b
 Standards, Bureau of, 3400a
 Standard Time, 3401a
 Standish, Miles, 975b, 3402b
 Stanford, Leland, 3403a
 Stanislas Augustus, 2884a
 Stanley, Henry M., 2144b, 3403a
 Stanovoi Mountains, 3403b
 Stanton, Edwin McMasters, 3404a
 Stanton, Elizabeth Cady, 3404a, 3396b
 Stanton, Frank Lecky, 3404b
 Star, 866a, 3387a, 3406b
 Starch, 3404b

The letter a, after a number, indicates column 1; the letter b, column 2.

Superdreadnaught, 2496b
 Superior, Lake, 3473b
 Superior, Wis., 3474a
 Superior Conjunction, 317a
 Supernaturalism, 3474a
 Superstition, 3474a
 Supervisor, 3474b
 Supper at Emmaus, The, 3047a
 Supply and Demand, 3475a
 Supremacy, Royal, 3475b
 Supreme Court of Canada, 3475b
 Supreme Court of the United States, 3475a, 3475b
 Surabaya, Java, 3476b
 Surface Measure, 2315a
 Surgeon Bird, 1859a
 Surgery, 3476b
 Surinam, 1167a
 Surrogate, 3477b
 Surrogate Court, 2045b
 Surveying, 3478a
 Survey of Land, 2012a, 2012a
 Suss, Persia, 3478a
 Suspension Bridge, 558b
 Susquehanna River, 3478b
 Sutherland, George, 3478b
 Sutlej River, 3478b
 Suttie, 3478b
 Swallow, 3478b
 Swallowing, 3478a
 Swamp, 2259a
 Swamp Sassafras, 2220b
 Swan, 3479a
 Swanee River, 1285b
 Swayne, Charles, 1775b
 Sweat, 2797b
 Sweat Glands, 3219b
 Sweatshop System, 3479b
 Sweden, 3480a
 Swedenborg, Emanuel, 3482b
 Swedenborgiana, 3482a
 Swedish Movement Cure, 3116a
 Sweet Alyssum, 3483b
 Sweet Bay, 2220b
 Sweetbriar, 1185b, 2488a
 Sweet Clover, 2234a
 Sweet Flag, 3484a
 Sweet Gum, 2112b
 Sweet Locust, 1714a
 Sweet Pea, 3484a
 Sweet Potato, 3484a
 Sweet Scabious, 1345b
 Sweet William, 3484a
 Sweeney, 1230a
 Swift, 3484b
 Swift, Jonathan, 3484b
 Swimming, 3485b
 Swinburne, Algernon Charles, 3486b
 Swine, 1705a
 Swing, The, 2021a
 Swiss Guard, 3486b
 Swinton, William, 3486b
 Swiss Family Robinson, 3486b
 Switzerland, 3487a
 Sword, 3490a
 Swordfish, 3490a
 Sycamore, 3490b
 Sydney, N. S. 3490b
 Sydney, New South Wales, 3490b
 Sydney Mines, N. S., 3491a
 Syenite, 3491a
 Syllabication, 2628b
 Sylligism, 3491a
 Symbol, 3491b
 Sympathetic System, 2509a
 Synagogue, 3492a
 Syncope, 1822b
 Syndicalism, 3492b
 Synecdoche, 3492b
 Synesius, 3092b
 Synges, John, Millington, 3493a
 Synod, 2822a
 Synodical Month, 3404b
 Syntax, 1846a, 3493a
 Synthesis, 3493a
 Syracuse, Battle of, 1819b
 Syracuse, Italy, 3493b
 Syracuse, N. Y., 3493b

Syracuse University, 3494a
 Syria, 3494a
 Syriac, 3494b
 Syringa, 3494b
 Systemic Circulation, 326b

T

T, 3495a
 Tabernacle, 3495a
 Tabernacles, Feast of, 3495b
 Tables of Mortality, 2417b
 Taboo, 3496a
 Tabor, Mount, 3496a
 Tagore, Persia, 3496a
 Tahe, Alexander Antonin, 3496b
 Tacitus, Publius Cornelius, 3497a
 Tacking, 3158a, 3497a
 Tacoma, Wash., 3497a
 Taconic Mountains, 3498a
 Tactile Cortex, 3502a
 Tadpole, 3498a
 Taffeta, 3498a
 Taft, Lorado, 3498a
 Taft, William Howard, 3498b
 Tagalog, 2818a
 Tagnan, 1365b
 Tagore, Rabindranath, 1780b, 3503b
 Tahiti Archipelago, 3336a
 Tahoe, Lake, 341a, 3504a
 Tallor Bird, 3504a
 Taine, Hippolyte Adolphe, 3504a
 Taiwan Island, 1380b
 Taj Mahal, 3504b
 Talc, 3504b
 Talent, 3505a
 Tale of a Tub, 2485a
 Tales of Hoffmann, 2636b
 Tallman, 3505a
 Talking Machine, 3505a
 Tallahassee, Fla., 3506a
 Talleyrand-Perigord, Charles Maurice, 3506b
 Tallow, 3507a
 Tallow Tree, 3507b
 Talmage, Thomas DeWitt, 3507b
 Talmud, The, 2507b
 Talus, 3508a
 Tamarack, 3508a
 Tamarind, 3508a
 Tambourine, 3508b
 Tamerlane, 1783b
 Tammany Society, 3508b
 Tammany Tiger, 3476a
 Tam O'Shanter, 810a
 Tampa, Fla., 3509a
 Tampico, Mex., 3509b
 Tanager, 3509b
 Tananarivo, Madagascar, 126a
 Tancred, 3510a
 Tanev, Roger Brooke, 3510a
 Tanganyika, 3510a
 Tangerine, 3510b
 Tangier, Morocco, 3510b
 Tango, 1025b
 Tank, Armored, 3511a
 Tannhauser, 3512a
 Tannic Acid, 3512a
 Tannin, 3512a
 Tanning, 2072b
 Tansy, 140a, 3512b
 Tantalus, 2770a, 3512b
 Tautain, 3512b
 Tapajos, 3512b
 Tapestry, 3512a
 Tapeworm, 3512b
 Tapioca, 3514a
 Tapis, 3514a
 Taps, 692b
 Tar, 3514a
 Tarantula, 3584a, 3514a
 Tarbell, Ida Minerva, 3514b
 Tarbush, 1814b
 Tare, 3514b, 3765b
 Target, 3514b

Targums, 1660b, 3515a
 Tariff, 3515a
 Tariff of Abominations, 3516a
 Tarkington, Newton Booth, 3516b
 Tarpeian Rock, 3517a
 Tarsus, 3517a
 Tarquinus Lucius (the Elder), 3517a
 Tarquinus, Lucius (the Proud), 3100a, 3517a
 Tarshish, 3517b
 Tarsus, Asia Minor, 1368a, 3519a, 3517b
 Tarsus, 3517b
 Tartar, 3517b
 Tartar, Emetic, 3517b
 Tartaric Acid, 3518a
 Tartars, 3518a
 Tartarus, 3518a, 3535b
 Tarsus, 3518a
 Tashkent, Asiatic Russia, 3518a
 Tasmania, 3518b
 Tasmanian Wolf, 3519a
 Tasso, Torquato, 3519a
 Taste, 3519b
 Tatler, The, 23b
 Tattooing, 3520a
 Taunton, Mass., 3520a
 Taurus, 3520b
 Tautou, 465a
 Tax, 3520b
 Taxicab, 3522a
 Taxidermy, 3522a
 Tax Sale, 3522a
 Tax Title, 3522a
 Tax, 3522a
 Taxpayer, 2872b
 Taylor, Bayard, 3522a
 Taylor, Jeremy, 3523b
 Taylor, Zachary, 1323a, 3523b
 Tchad, Lake, 743a
 Tchaikovsky, Peter, 3525a
 Tea, 2483a, 3525a
 Teachings, 3525a
 Teaching, Methods of, 2312b
 Teak, 3526a
 Teal, 1150a
 Teasel, 3526b
 Teck, Alexander Augustus Frederick, 3526b
 Tebriz, Persia, 3496a
 Technical and Industrial Education, 3784b
 Technical High Schools, 3788a
 Tecumseh (Indian), 3526b
 Te Deum, 3526b
 Teetertail, 3185a
 Teeth, 2872a, 3527a
 Tegner, Emanuel, 3527b
 Tegucigalpa Honduras, 3527b
 Tehachapi Mountains, 340b
 Teheran, Persia, 3527b
 Tehuantepec, Isthmus of, 3528a
 Teletograph, 3528a
 Telegram, Write a (game), 1258a
 Telegraph, 1822a, 3417a, 3528b
 Telegraph, Wireless, 1822a, 3531a
 Telepathy, 3532a
 Telephone, 1822a, 3532b
 Telephone, Wireless, 1822a, 3535a
 Telescope, 1822a, 3535b
 Telesio, 3536a
 Tell, William, 3489a, 3536a
 Temple, Vale of, 3536b
 Temperance, 3536b
 Temperature, 3536b, 3536b
 Temperature of Body, 3536b
 Tempering, 3537a
 Temples, Nights, 3537a
 Temple, 3537a
 Temple, The, 3537b
 Temple of Fame, 3796b
 Temuqin, 1460a
 Tenacity, 3537b
 Tender, 3538a

The letter a, after a number, indicates column 1; the letter b, column 2.

- Tonic, 3593b
 Tongking, French Indo-China, 3594a
 Tongue, 3594a
 Tonnage, 3594a
 Tonnelier, 3595b
 Tonilla, 3595b
 Tonsure, 3594b
 Tony, or Tontl, Henry de, 3595a
 Toombs, Robert, 3595a
 Toothache Tree, 2937b
 Top, 3595a
 Topaz, 461a, 3595b
 Topeka, Kan, 3595b
 Tornado, 3595a
 Toronto, Ont., 3595b
 Toronto, University of, 3595a
 Torpedo, 3595a
 Torpedo (fish), 3599a
 Torpedo Boat, 3599b
 Torpedo Boat Destroyer, 3599b
 Torquemada, Thomas de, 3599b
 Torrens System, 3599b
 Torricelli, Evangelista, 3600a
 Torrington, Conn., 3600a
 Tortion Balance, 3600b
 Tort, 3600b
 Tortoise, 3600b
 Tortoise Shell, 3601a
 Torture, 3601a
 Tory, 3601a
 Tossing Tally (game), 1441a
 Totem, 3601b
 Totten, George M., 2720b
 Toucan, 3601b
 Touch, 3602a
 Touch Ball (game), 1440a
 Toulon France, 3602a
 Toulouse, Battle of, 3647a
 Toulouse, France, 3602b
 Tourmaline, 461a, 3602b
 Tournament, 3602a
 Tourniquet, 3603a
 Tours, Battle of, 1319b
 Tours, France, 3603a
 Toussaint, Francois Dominique, 3603b
 Tower, 3603b
 Tower Bridge, 2152a
 Tower of London, 3604a
 Towers of Silence, 3604a
 Town Meeting, 3604a
 Township, 2013a, 3604b, 3695a
 Township in Sections, 2013a
 Toxalbumin, 314b
 Toxicology, 3604b
 Toxins, 3605a
 Toynbee, Arnold, 3336a
 Tracery, 3605a
 Trachea, 3605a
 Tracheotomy, 995a
 Trachyte, 3605a
 Tractarianism, 2694a
 Traction Engine, 3605b
 Trade Account, 3605b
 Trade Discount, 1079b
 Trade Game, 1441b
 Trade-mark, 3606a
 Trade Schools, 3785a
 Trade Unions, 1999b
 Trade Winds, 3606a
 Trafalgar, 3606b
 Tragacanth, 3606b
 Tragedy, 1115a, 3606b
 Tragopan, 3607a
 Trailing Arbutus, 167b
 Traill, Catherine Parr, 3607a
 Trajan (Marcus Ulpius Trajanus), 3607a
 Trajan's Column, 3095b, 3607b
 France, 3607b
 Transalpine Gaul, 1455a
 Trans-Atlantic Flights, 1362b
 Transcendentalism, 3607b
 Transcontinental Systems, 3609b
 Transept, 3607b
 Transfiguration, The, 2705a
- Transformer, 3608a
 Transfusion of Blood, 3608a
 Transit Instrument, 3608a
 Transit of Venus, 3753b
 Transmigration of the Soul, 3608b
 Transpiration, 2074b
 Transportation, 3608b, in the United States, 3687b
 Trans-Siberian Railroad, 3294a, 3608b
 Transvaal, The, 3609b
 Transylvania, 3611a
 Trapdoor Spider, 3611a
 Trapezium, 2977a, 3611b
 Trapdoor, 2977a, 3611b
 Trapping, 3611b
 Trappists, 3612a
 Travels in Distant Lands, 3612a
 Traverse City, Mich., 3622b
 Travertine, 3622b
 Trawling, 3622b
 Treadmill, 3622b
 Treason, 3623a
 Treasure Island, 3423b
 Treasure State, The, 2396b
 Treasury Department, 3623a
 Treas, 3623b
 Trebizond, Turkey, 3623b
 Treble, 3624a
 Tree, 3624a
 Tree, Herbert Beerbohm, 3631a
 Tree, The (poem), 2020b
 Tree Frog, 3631a
 Tree-Planters' State, 2495a
 Tree Toad, 3631a
 Trefoll, 3631b
 Trent, Council of, 3093b, 3631b
 Trent Affair, 3223b, 3631b
 Trent Canal, 675a, 675a
 Trento of Guarante, 3122a
 Trenton, Battle of, 3632b
 Trenton, N. J., 3632a
 Trenton, Ont., 3632b
 Trenton Series, 3632b
 Trent River, 3631b
 Trepan, 3632b
 Trephining, 3633a
 Trespass, 3633a
 Trevithick, Richard, 2149b
 Trial by Battle, 3633a
 Triangle, 207b, 3633a
 Triassic System, 3633a
 Triassic Acid, 14a
 Tribune, 3633b
 Trichina, 3633b
 Trichinosis, 3634a
 Tricolor, 3634b
 Tricycle, 3634b
 Trieste, Italy, 3634b
 Trigonometry, 3634b
 Trillium, 3635a
 Trimeter, 2311b
 Trinidad, Colo., 3635b
 Trinidad Island, 3632a, 3635a
 Trinitrotoluol, 3635b
 Trinity, 3635b
 Trinity Sunday, 3636a
 Tripthong, 2633a
 Triple Alliance, 3636a
 Triple Entente, 3636a
 Triple Expansion Engine, 3644b
 Tripoli (city), 3636b
 Tripoli (geology), 364b
 Tripoli, North Africa, 3636b
 Tripore, 3637a
 Triumph, 3637a
 Tripunah, Arab, 168a
 Triumvirate, 631a, 3102b, 3637a
 Tristram Shandy, 3422a
 Trocadero, Palace of the, 3737b
 Trochoid Meter, 2311b
 Trogon, 3637a
 Trojan War, 2457b, 3639a
 Trolling, 3637b
- Trollope, Anthony, 3637b
 Trolls, 1232b
 Trombone, 3637b
 Tromp, Martin Harpertoon, 3637b
 Tropic Bird, 3637b
 Tropics, 1167a, 3638a
 Trotsky, Leon, 493b, 3120a, 3145b, 3638a
 Troubadours, 3638b
 Trout, 3685b
 Trovatore, Il, 1771a
 Trouvere, 3638b
 Troubridge, John Townsend, 3638a
 Troy, 2457b, 3639a
 Troy, N. Y., 3639a
 Troy Pound, 2472a, 3643a
 Troy Weight, 3639b
 Truce, 3640a
 Truce, Flag of, 1338b
 Truffle, 3640a
 Trumbull, Jonathan, 3640a
 Trumbull, Lyman, 3640a
 Trumpet, 3640a
 Trumpet Fish, 363a
 Trumpet Flower, 3640b
 Trumpetwood, 722b
 Truro, N. S., 3640b
 Truss Bridges, 655a
 Trust, 3641a
 Trust Company, 3640b
 Trustees, 3641a
 Tryptsin, 1075b, 2725b, 2784b
 Tsana, Lake, 9b
 Tsar, 1015a
 Tschikowsky, Peter Ilyich, 3625a
 Tsitse Fly, 3642a
 Tuberculosis, or Consumption, 3642a
 Tuberosa, 3642b
 Tubular Bridges, 555b
 Tucuman, Arch., 3642b
 Tucuman, Argentina, 3643a
 Tudor, House of, 3643a
 Tudor Style, 3643a
 Tuesday, 3643b
 Tuft, 3643b
 Tufts College, 3643b
 Tuilleries, 3643b
 Tulane, Paoli, 3644a
 Tulane University, 3644a
 Tulip, 3644a
 Tulip Tree, 3644b
 Tulsa, Okla., 3644b
 Tumbleweed, 3645a
 Tumor, 3645a
 Tuna, 3645a
 Tundra, 3645a
 Tungsten, 3645b
 Tungsten Lamp, 1203b
 Tunic, 1143b, 3645b
 Tuning Fork, 3645b
 Tunis (protectorate), 3645b
 Turners, 1154b
 Tunnel, 3645a
 Turkey, 3645a, 3646a
 Tupelo, 465a
 Tupper, Charles, 3646a
 Turanian, 3646b
 Turban, 3646b
 Turbine, 3647a
 Turbot, 3647b
 Turnagain, Ivan Sergeyevitch, 3648a
 Turin, Italy, 3648a
 Turkistan, 3648b
 Turkey, 3649a, 3763b, 2919a
 Turkey (bird), 3663b
 Turkey Buzzard, 3654a
 Turkey Red, 2510a
 Turkish Bath, 361a
 Turks, 3654a
 Turmeric, 3654a
 Turner, Joseph Mallard Wilham, 3654a
 Turner, 3655b
 Turnip, 3654b
 Turnstone, 3654b
 Turnverein, 3654b

Turpentine, 140a, 3655a
 Turquoise, 461a, 3655b
 Turtle, 3655b
 Turtle Dove 2551b, 3655b
 Tusculossa Ala, 3655a
 Tuscan Order, 855b
 Tuscany, 3655a
 Tuscarora Indians, 3655a
 Tuskegee Normal and Industrial Institute 3655a
 Tussock Moth 3655b
 Twin Mark, 447b
 Tweed, 3655b
 Tweed, William Marcy, 3655b
 Tweed River, 3655b
 Twelfth Day, 1871b
 Twelve Great Paintings, 3755b
 Twelve Labors of Hercules 1675a
 Twelve Tables, Law of the, 4100a, 3657a
 Twenty Thousand Leagues under the Sea 3751a
 Twilight, 3657a
 Twilight Sleep, 3657b
 Two Cities A Tale of 1075b
 Two Green and Glittering Gold-Chairs, 1950a
 Two-step, 1075b
 Two Years Before the Mast, 1024b
 Tycho Brahe 539b
 Tyler, John, 3657b
 Tyler, Tex., 3660a
 Tyler, Wat, 3660b
 Tympanum, 1163a
 Tyndale, William, 3660b
 Tyndall John, 3660b
 Type, 1897b 1823a, 3661a
 Typesetting Machines, 2117a, 3390a
 Typewriter, 1823a 3662a
 Typhoon Fever, 3662b
 Typhoon 797b, 3662a
 Typhus Fever 3662a
 Tyre, Phoenicia 3662b
 Tyrol, 3663b

U

U, 3662b 3664a
 Udal, Nicholas, 3664a
 Udal, 3664a
 Uganda, British East Africa, 3664a
 Ugly Duckling, The, 3435b
 Uliana, 3665a
 Ulna Mountains 3665a
 Umlenders 3649b 3611a
 Ukraine The, 3665a
 Ulcer, 3665b
 Ulna, 3611a
 Ultima Thule 3676b
 Ultramarine 3665b
 Ulysses 2896a, 3665b
 Umbelliferæ, 3666a
 Umler, 3666a
 Umbrella Bird, 3666a
 Umlak 1264b
 Unalakpa Island, 3666a
 Uncia 3666a
 Uncial Letters 3950a
 Uncle Sam
 Uncle Tom's Cabin, 3446a
 Uction, or Extreme Uction 3666b
 Underground Railroad, 3666b
 Underground Railway, 3453a
 Undershot Wheel 3521b
 Underwood, Oscar 3666b
 Underwood-Simmons Tariff Act, 3615b
 Uddines, 1294a
 Unemployment, 3667a
 Ungava, Canada 3668a
 Ungulates 3668a
 Unicorn, 3668a
 Unicorn Fish, 3475a
 Unicorn Whale, 3476a

Uniforms, Military, 3668a
 Uniforms, Naval, 3668a
 Union, Act of, 3669a
 Union, States of the, 3669a
 Union Jack 1342a
 Union of South Africa 3669a
 Uniontown, Pa., 3670a
 Unit, 3670a
 Unitarians 3670b
 United Colonies of New England, 3527b
 United Daughters of the Confederacy, 909b
 United Kingdom The, 3671a
 United Press, 254b
 United Provinces of Agra and Oudh, 3671a
 United States Chamber of Commerce of the 746b
 United States, Education in the, 3699a
 United States, Great Seal of the, 3692a
 United States, History of the, 3699b
 United States, Possessions of the, 3694a
 United States, Supreme Court of, 3699b
 United States, Territorial Expansion of the, 3697b
 United States, Territories of the, 3699a
 United States Army, 224b
 United States Const Guard, 856b
 United States Colonies 844b
 United States Courts 975a
 United States Indian Industrial School, 3671b
 United States in the World War, 3927a
 United States National Bureau of Standards, 3400a
 United States Naval Academy, 2492b
 United States Notes, 2386a
 United States of America, 3671b
 United States Sculpture, 3235b
 United States Senate, 3252a
 United States Steel Corporation 3713a
 United States Weather Bureau 3856a
 United Workmen, Ancient Order of, 118a
 Uralines, 3280b
 Universal City, Calif., 642b
 Universalists, 3719b
 Universal Language, 3719b
 Universe 3719b
 University, 3719b 3720a
 University Extension, 3721a
 University of Halle 1616a
 University of the State of New York 2652a
 Unspeakable Turk, 3651a
 Unter den Linden, 397a 3721b
 Uper, 3721b
 Upland Cotton, 969a
 Upper Canada, 3658a
 Ural Mountains 3721b
 Ural River 3722a
 Uralia, 2495b 3722a
 Uranium 3722a
 Uranus (mythology) 3722a
 Uranus (planet) 3722a
 Urban (Pope) 3722b
 Urbana Ill, 3722b
 Urine 3722b
 Urus Major, 3695b 3723a
 Urus Minor, 3723a
 Urus, Camille, 3723a
 Ursulines 3723a
 Uruguay, 3723b
 Uruguay River, 3724b
 Ury, 3724b
 Utah, 3725a
 Utah, University of 3725b

V

Utah Lake 3725b
 Ute, 3725b
 Utica, N. Y., 3725b
 Utica, Phoenicia 3725b
 Utilitarianism 3725a
 Utopia, 2411b 3725b
 Utrecht, Netherlands, 3725b
 Utrecht Peace of, 3725b
 Ux, 3730b
 V 3731a
 Vaca Cobre de 3652a
 Vacation Schools 3731a
 Vaccination, 1866b 3731a
 Vaccine Therapy, 3731b
 Vacuum, 3732a
 Vacuum Cleaner 3732a
 Vail Alfred, 2411a 3530b
 Valdez Hill, 3732a
 Valencia Spain, 3732a
 Valens 3732b
 Valentine Saint 3732b
 Valentinian I 3732b
 Valentinian III 3732b
 Vale of Towy, 3530b
 Valerian, 3733a
 Valhalla 3733a
 Valkyries 3733a
 Valladollis, Mex 2411b
 Vallojo Calif 3733a
 Vallier, 3733b
 Valleyfield Que 3734a
 Valley Forge 3734a
 Valmy Battle of, 1219b
 Valois House of 3734b
 Valparaiso, Chile 3734b
 Valparaiso University, 3735a
 Value 3735a
 Valve 3735a
 Vampire 3735a
 Vampire Bat 3735b
 Canadian 3735b
 Van Buren, Martin 3735b
 Vancouver B C 3735b
 Vancouver, George, 3740a
 Vancouver Wash 3740b
 Vancouver Island, 3740b
 Vandalis 3741a
 Vanderbilt (family) 3741a
 Vanderbilt University 3741b
 VanDyck Anthony 3741b
 Van Dyke Henry 3742a
 Van Elze Charles Richard, 3742b
 Van Horn, William Cornelius 3742b
 Vanilla 3742b
 Vanity Fair 372a 3854b
 Vannucci Pietro 2800b
 Van Rensselaer, Stephen 3742a
 Van Twiller Wouter, 2560a
 Vapor, 3743a
 Vapor Light 1205b
 Varicose Veins 3743a
 Variety, 3743a
 Variola 3743a
 Varioloid 3743b
 Varish, 3743b
 Vasco da Gama, 1466b
 Vase 3744a
 Vaseline 3744a
 Vashit 424a
 Vassal, 1214a
 Vassar, Matthew 3744b
 Vassar College 3744a
 Vasterland, The, 2091b 2283b
 Vatican 3744b
 Vaudouin, 3745a
 Vatican Council, 2902b 3745a
 Vatican Library, 3745a
 Vault, 3745a
 Vecchio Palma 2705a
 Vecchio Tiziano 2585b
 Vegas, 3745a
 Vedic Literature, 510a
 Veery, 3576b

The letter a. after a number, indicates column 1; the letter b. column 2.

- Vega Carpio, Felix Lope de, Vice-Admiral, 26b
 3745b
 Vice-President, 3765b
 Viceroy, 3766b
 Vicksburg, Miss., 3767a
 Victor Emmanuel II, 3767a
 Victor Emmanuel III, 3767b
 Victoria (Queen), 3767b
 Victoria, Australia, 3768b
 Victoria, B. C., 3769b
 Victoria Cross, 3770a
 Victoria Falls, 3770a
 Victoria Nyanza, 3770a
 Victory, The, 2505a
 Vicuna, 3770b
 Vienna, Austria, 3770b
 Vienna, Congress of, 3771b
 Vikings, 3603a
 Villa, Francisco, 3232b, 3772a
 Village Blacksmith, The, 3016a
 Villeins, 3772b
 Villi, 3772b
 Vimy Ridge, 3925a
 Vilna, Russia, 3772b
 Vincennes, Ind., 3772b
 Vincent, George Edgar, 3773a
 Vincent, John Heyl, 3773b
 Vinci, Leonardo da, 2704a, 3772b
 Vinegar, 13a, 3774a
 Vinland, 3774b
 Vienne, Francois Morgan de, 3774b
 Viol, 3774b
 Violet, 3774b
 Violin, 3774b
 Violoncello, 3774b, 3775a
 Viper, 3775b
 Virechow Rudolf, 3775b
 Vireo, 3775b
 Virgil, 3775b
 Virginia, 3776b
 Virginia, Mann, 3781b
 Virginia, University of, 3782a
 Virginia City, Nev., 3782a
 Virginia Cowslip, 3188b
 Virginia Creeper, 1853b, 2882a, 3782a
 Virginians, The, 3554b
 Virginia Resolutions, 1941b
 Virgin Islands of the United States, 3620b, 3776a
 Virginius, 3712a
 Virgo, 3782b
 Virus, 3782b
 Visayans, 2818a
 Viscount, 3782b
 Vishnu, 3782b
 Visible Speech, 3782b
 Visigoths, 1540a
 Vision, 3783a
 Vision of Piers Plowman, 2018a, 2121a
 Vision of Sir Launfal, 1545b
 Vistula, 3783b
 Vital Capacity, 549b
 Vital Statistics, 2905b
 Vitamines, 3783b
 Vitex, 2487b
 Vitreous Humor, 1287b
 Vitrol, Oil of, 2458a
 Vivisection, 3783b
 Vizier, 3784a
 Vladimir the Great, 3142a
 Vladivostok, Siberia, 3784a
 Vocational Education, 3784b
 Vocational Guidance, 3785a
 Vocational Schools, 3785b
 Vodka, 3787a
 Voice, 3787a
 Volapuk, 3787b
 Volatile Alkali, 113b
 Volatile Oils, 2645a
 Volcano, 1479b, 3787b
 Vol, 3788a
 Volga River, 3788a
 Voliva, Wilbur G., 1110a
 Volt, 3789b
 Volta, Alessandro, 3789b
 Voltaic Battery, 1198a
 Voltaic Electricity, 1302a
 Voltair, 3789b
 Voltmeter, 3790a
 Volume, Measure of, 2315b
 Volunteers, 3790b
 Volunteers of America, 3790b
 Vom, 2678a
 Vomer, 1290b
 Vomiting, 3791a
 Von, 3791a
 Vorticella, 3791a
 Voorges Mountains, 3791a
 Vote, 325b, 1194a
 Voters, Registration of, 3043b
 Voting Machine, 3791b
 Vow, The Sun, 3236b
 Vowels, 2691b, 3791b
 Vulcan, 3792a
 Vulcanizing, 1546b, 1821a, 2877a, 3127b
 Vulgate, 3792a
 Vulture, 3792b
- W**
- W, 3793a
 Wabash, Ind., 3793a
 Wabash River, 3793a
 Wacht Am Rhein, Die, 3793a
 Waco, Tex., 3552b, 3793b
 Wadal, French Congo, 3793b
 Wager, 3793a
 Wagon, 3793a
 Wagner, Wilhelm Richard, 3794b
 Wagon, 3795a
 Wagram, Battle of, 2472a, 3795a
 Wagtail, 3795b
 Wagonwheeler, 2928b
 Waikiki Beach, 3618a
 Waite, Morrison Remick, 3795b
 Wake, 3795b
 Wake Robin, 2635a
 Waldeenses, 3795b
 Walden, Albrecht Eusebius, 3795b
 Walden, 3795b
 Wales, 3796a
 Wales, Prince of, 3796b
 Wallahs, 3796b
 Walker, Francis Amasa, 3796b
 Walker, John G., 2721a
 Walker, William, 583b, 3797a
 Walkerville, Ont., 3797a
 Walking Leaves, 2071a
 Walking Stick, 3797b
 Wallabies, 1925b
 Wallace, Alfred Russell, 3797b
 Wallace, John F., 3722b
 Wallace, Lewis, 3798a
 Wallace, William, 3224a, 3798a
 Walla Walla, Wash., 3798b
 Wallenstein, Albrecht Eusebius, 3557a, 3798b
 Wallflower, 3799a
 Wall of China, The Great, 1560b
 Wallons, 282b, 3799b
 Wall Paper, 3799b
 Wall Street, 3799b
 Walnut, 3799b
 Walpole, Horace, 3800a
 Walpole, Robert, 2800a
 Walrus, 3800b
 Walrus and the Carpenter, The, 2023a
 Waltham Mass, 3800b
 Walton, Isaac, 3801a
 Walts, 1025a, 3801a
 Wampanag Indians, 3801a
 Wampum, 3801a
 Wampanag John, 3801b
 Wandering Jew, 3801b
 Wandering Jew (botany), 3801b
 Wapiti, 1215a
 War, 3802a
 War, Declaration of, 3802b
 War, Declarations of, in 1914, 3816b
 War, Declarations of, in 1915, 3920a

- War, Declarations of, in 1916 3520b
 War, Declarations of, in 1917 3524b
 War Department of 3503a
 War and Peace, 3523a
 Warbeck, Perkin, 3524a
 Warblers 3503a
 Ward (city), 3524 3523b
 Ward (law), 3503b
 Ward, Artemus, 573a
 Ward, Elizabeth Stuart Phelps, 3503b
 Ward, Henry A., 3523a
 Ward, Mrs. Humphry, 3503b
 Ward, John Quincy Adams, 3504a
 Warden, 3523b
 Warfield, David, 3504a
 War Lord of Europe 3577b
 Warner, Charles Dudley, 3504b
 Warner, Seth, 3504b
 War of 1812, 3504b
 War of the Austrian Succession, 3504a
 War of the Bavarian Succession, 3504a
 War of the Polish Succession, 3504a
 War of the Spanish Succession, 3504a
 Warrant, 3506a
 Warranty Deed, 1057a
 Warren, Joseph 3501a, 3506b
 Warren, Ohio 3506b
 Warren, P. 3506b
 Warsaw, Poland, 3506b
 Warship, 2495b
 Wart, 3507a
 Wart Egg, 3507a
 Warwick, Richard Neville, 3507b
 Wasatch Mountains, 3507b
 Washburn College, 3507b
 Washing Machine, 3507b
 Washing Soda, 140a
 Washington (state), 3503a
 Washington, Booker T. Taliaferro 3504a, 3515b
 Washington D. C., 3515b
 Washington, George, 439a, 440a, 3517a
 Washington, Lawrence 3517b
 Washington, Martha, 3522a
 Washington, Pa., 3522a
 Washington, Treaty of 3522a
 Washington, University of, 3522b
 Washington and Lee University 3522b
 Washington Arch, 3522b
 Washington Elm, 3523a
 Washington Monument, 3523a
 Washington University, 3523a
 Washita River, 3523a
 Wasp, 3523b
 Watauga Association, 3523b
 Watch 3523b
 Watchful Waiting, 3715a
 Watch on the Rhine, The, 3520b, 3715a
 Water, 1097a, 3525b 3525a
 Water, Ordinal by 3570b
 Water Beetle 3525b
 Water Boatmen, 3525a
 Water Bug, 3525a
 Waterbury Canal, 3525b
 Water Chinquapin, 3505b, 3527a
 Water Colors 2702a, 3525b
 Waterfall, 722a
 Water Gape 3524a
 Water Gas, 1452a
 Water Lily, 3524b
 Waterloo, Battle of, 1320a, 3524a
 Waterloo, Iowa 3525a
 Waterloo, Ont. 3525a
 Water-mark, 2722a
 Watermelon, 3525a
 Water-motor, 3521b
 Water Ouzel, 1072b
 Water Plants, 152b
 Water Polo, 3525b
 Water Power, 3525b
 Waterproofing, 3525b
 Water Purification, 3525b
 Water Scorpion, 3525a
 Watershed, 354a, 1044b, 3530a
 Watertrap, 3525b
 Water Striders, 3525a
 Water Supply, 1101b
 Water Tiger, 3525a
 Waterton Lakes Park, 2743b
 Watertown, N. Y., 3530b
 Watertown, S. D., 3530b
 Waterville, Maine, 3531a
 Watervliet, N. Y., 3531a
 Water Wheel, 3531a
 Waterworks, 3531b
 Watson, John, 3532a
 Watson, Thomas S., 3532a
 Watson, William, 3532a
 Watt, 3532b
 Watt, James, 3512b, 3532b
 Wattain, Jean Antoine, 3532b
 Watts, George, 3532a
 Watts, George Frederick, 3532a
 Watts Isaac, 2750a, 3532b
 Wat Tyler's Rebellion, 3506b
 Waukegan, Ill., 3532b
 Waukegan, Wis., 3534a
 Wausau, Wis., 3534a
 Waverly Novels, 3525b
 Waves 3534a
 Wax, 3534b
 Wax Myrtle, 681b
 Wax Tree, 681b
 Waxwing, 3534b
 Way Bill, 432a
 Waycross, Ga., 3535a
 Wayne, Anthony, 3535a
 Wealth, 3535b
 Wealth of Nations, The, 3526b
 Weasel, 3535b
 Weather, 1462b
 Weather Bureau, 2429a, 3536a
 Weather Chart, 3537b
 Weather Map, 3511a, 3537b
 Weaver, James Baird, 3538a
 Weaver Bird, 3538b
 Weaving, 3538b
 Webb City, Mo., 3539b
 Weber, Karl Maria Friedrich Ernst von, 3539b
 Webster, Daniel, 3540a
 Webster, Henry Kitchell, 3541a
 Webster, Noah, 3541a
 Webster-Ashburton Treaty, 3541a
 Wedge, 3541a
 Wedgwood, Josiah, 3541b
 Wedgwood, Thomas 3547b
 Wedgwood Ware, 3541a
 Wednesday, 3541b
 Weed, Thurlow, 3541b
 Weeds, 3541b
 Week, 3542a
 Weeping Willow, 3539a
 Weevil, 3542a
 Wee Willie Winkie and Other Stories, 1934a
 Weighing Scale, 3542b
 Weight, 3543a
 Weight, Atomic, 278a
 Weight, Unit of, 3515b
 Weights and Measures 3543a
 Weimar, Germany, 3544a
 Welding, 3545b
 Welland, Ont., 3544b
 Welland Canal, 3544b
 Well Boring, 3545a
 Welles, Gideon, 3545b
 Wellesley, Richard Colley 3545b
 Wellesley, 3545b
 Wellesley College, 3546a
 Wellington, Arthur Wellesley 3546a
 Wellington, New Zealand 3546a
 Wells, Herbert George, 3547a
 Weinbach, Karl, 3547b
 Weinbach Burner 3547b
 Welwitschia, 3547b
 Wellworth, Thomas, 2446b
 Wesley (family), 3547b
 Wesleyan Methodists, 3548b
 West, Benjamin, 2448b
 Westbrook, Harriet, 3527b
 West Chester, Pa., 3549a
 Western Australia, 3549a
 Western Reserve, 3549b
 Western Reserve University, 3549b
 Westfield, Mass., 3549b
 West Flanders 1344a
 West India, 3550a
 Westinghouse, George, 54a, 3550b
 Westminster Abbey 3550b
 Westminster Hall 3551a
 West Orange N. J., 3552a
 Westphalia, 3552a
 Westphalia, Peace of, 3551a
 West Point, N. Y., 3551b
 West Virginia, 3552a
 West Virginia University 3552a
 West Docks 1032a
 Weyler, Nicolan Valeriano 3555a
 Wayman Stanley John, 3555b
 Whale, 3555b
 Whalibone 3555b
 Wharton, Edith 3555b
 What Does Little Birdie Say 3521a
 Wheat, 3557a
 Wheat Insects 3559a
 Wheatstone, Charles, 3559a
 Wheat Thief, 1564a
 Wheel, 3559b
 Wheel and Axle, 3559b
 Wheeler, Benjamin Ide, 3560a
 Wheeler, Joseph, 3560a
 Wheeler, William Almon 3560b
 Wheeling W. Va., 3560b
 When I Survey the Wondrous Cross, 1550b
 When We Plant a Tree (poem), 3530b
 Where Go the Boats, 2026a
 Whetstones 1714a
 Whig, 2590b, 3501a, 3708b, 3551a
 While Shepherds Watched 3526b
 Whip Grafting, 1544b
 Whippoorwill, 3561a
 Whirling Reelers, 3526a
 Whirlpool 3561a
 Whirlwind 3561b
 Whisky, 3561b
 Whisky Insurrection, 3561b
 Whisky Ring 3715a, 3562a
 Whispering Gallery, 3549a
 Whist, 3562a
 Whistler James Abbott Mc-Nail, 3562b
 White (color), 3562b
 White, Andrew Dickson, 3564a
 White, Edward Douglass, 3564a
 White, Richard Grant, 3564b
 White, Stewart Edward, 3564b
 White, William Allen, 3564b
 White Ants, 3564a
 White Arsenic, 3522b
 White Bronze, 370a
 White Caps, 3564b
 Whitefield, George, 3565a
 Whitefish, 2522a, 3565a
 White House, 3565a
 White House, 3520b

The letter a, after a number, indicates column 1; the letter b, column 2.

White Lead, 2865b
 White Mountains, 3865b
 White Paper, 477b
 White Pine, 3855a
 White Plains, Battle of, 2866b
 White Precipitate, 140a
 White River (Ark.), 2866b
 White River (Ind.), 2866b
 White Sea, 2897a
 White Vitriol, 2897a
 Whitewood, 285a
 Whitlock, Brand, 2867a
 Whitman, Marcus, 2867a
 Whitman, Walt, 2867b
 Whitney, Ell, 1823a, 2867b
 Whitney, James Flinn, 2868a
 Whitney, Mount, 641a, 2868a
 Whittier, John G., 2823a, 2868b
 Whooping Cough, 785a, 2869a
 Whortleberry, 122a
 Wichita, Kans, 2869a
 Wichita Falls, Tex., 2869b
 Wolff, John, 2861a
 Widgeon, 2869b
 Wiesbaden, Prussia, 2870a
 Wigwam, 2870a
 Wiggin, Kate Douglas, 2075a
 Wight, Isle of, 1484a
 Wilberforce, Samuel, 2870a
 Wilberforce, William, 2870b
 Wilcox, Ella Wheeler, 2870b
 Wild Cat, 2870b
 Wildcat Banks, 2871a
 Wilde, Oscar, 2871a
 Wilderness, Battle of the, 2871a
 Wild Flower, 123a
 Wild Laurel, 2056b
 Wilhelmine, Queen, 2871b
 Wilhelm Meister, 1529b
 Wilkes, Charles, 2861b, 2872a
 Wilkesbarre, Pa., 2872a
 Wilkie, David, 2872b
 Wilkins, Mary Eleanor, 1408b
 Will (law), 2874b
 Will (psychology), 790a, 2959a, 2962b, 2875a
 Willamette River, 2874b
 Willard, Emma Hart, 2875a
 Willard, Frances Elizabeth, 2875a
 William I (the Conqueror), 1220b, 2630a, 2875b
 William II Rufus, 2875b
 William III (England), 2875a
 William IV (England), 2876b
 William I (Germany), 2876b
 William II (Germany), 2877a
 William and Mary College, 2873a
 William of Orange, 2515b, 2897a, 2878a
 William of Wied, Prince, 68a
 William the Lion, 2223b
 Williams, George, 2870b
 Williams, John Sharp, 2878b
 Williams, Roger, 2876a, 2895b, 2064a, 2701b, 2112a, 2878b
 Williamsburg, Va., 2878b
 Williamsburg Bridge, 556a
 Williams College, 2878a
 Williamsport, Pa., 2878a
 Williamstown, Conn., 2879b
 Willis, John, 2877b
 Willis, Nathaniel Parker, 2879b
 Will-o-the Wisp, 1762b
 Willow, 2879b
 Wilmington, Del, 2880a
 Wilmington, N C., 2880b
 Wilnot, David, 2881a
 Wilnot Provizo, 2880b
 Wilson, Augusta Jane, 2881a
 Wilson, Henry, 2881a
 Wilson, James (America), 2881b
 Wilson, James (England), 2881b

Wilson, John, 2881b
 Wilson, Margaret, 2882b
 Wilson, William Lyne, 2890a
 Wilson, Woodrow, 2762a, 2882a, 2927b
 Wilton Rug, 2120b
 Winchell, Alexander, 2890a
 Wind, 1468b, 2890b
 Wind, Trade, 2890a
 Wind Cave National Park, 2745a
 Windermere, 2891a
 Windhover, 1945b
 Windlass, 2891a
 Windmill, 2891b
 Window, 2892a
 Windpipe, 2895a
 Windsor, Ont., 2892a
 Windsor Castle, 2892b
 Windward Islands, 2892b
 Windy Night, 2027a
 Wine, 2892b
 Winged Bull, 2892a
 Winged Lion, 2892a
 Winged Victory, 2323a, 2893a
 Winkelried, Arnold, 2893b
 Winnebago Indians, 2893b
 Winnipeg, Lake, 2893b
 Winnipeg, Man., 2893b
 Winnipegosis, Lake, 2894b
 Winona, Minn., 2894b
 Winslow, John Anson, 2895a
 Winston Salem, N C., 2895a
 Winter, 2034b, 2895a
 Wintergreen, 2895a
 Winter Solstice, 1166b
 Winthrop, John, 2895b
 Wire, 2895b
 Wire Glass, 2896a
 Wireless Telegraph, 2521a
 Wireless Telephone, 2525a
 Wire Nail, 2467a
 Wire Rope, 2116b
 Wireworms, 2896a
 Wirz, Henry, 120b
 Wisconsin, 2896a
 Wisconsin, University of, 2890b
 Wisconsin River, 2900b
 Wisdom Teeth, 2527a
 Wistaria, 2902a
 Wister, Owen, 2902a
 Withercraft, 2172a, 2902a
 Witch Hazel, 2902b
 Witenagemot, 2902b
 Witness, 2902a
 Witte, Sergei Yulievitch, 2902a
 Wittenberg, Germany, 2902a
 Witwatersrand, The Transvaal, 2510a
 Wood, 2898b
 Woden, 2835b
 Wolf, 2903b
 Wolf and the Lamb, The, 2030b
 Wolfe, James, 440b, 2904a
 Wolf Fish, 2904a
 Wolf's-bane, 14b
 Wolseley, Garnet Joseph, 2904a
 Wolsey, Thomas, 2904b
 Wolverine, 1525b
 Wolverine State, The, 2236a
 Woman's Christian Temperance Union, 2905a
 Woman's Relief Corps, 2906a
 Woman Suffrage, 2906b
 Wombat, 2906a
 Women's Clubs, 2906a
 Women Should Have the Vote (theme), 2560a
 Wood, 2626b
 Wood, A Cord of, 202a
 Wood, Leonard, 2906b
 Wood Alcohol, 2907a
 Woodcock, 1714b
 Wood Carving, 2907b
 Woodchuck, 2908a
 Woodcock, 2908a

Woodcraft Indians, 2560b, 261a
 Wood Distillation, 2908a
 Wood Engraving, 1237b
 Wooden Horse, 2460a
 Wooden Pavement, 2759b
 Woodmen of America, 2908a
 Woodmen of the World, 2908b
 Woodpecker, 2908b
 Wood Pewee, 2909a
 Wood Spirit, 2514a
 Woodstock, Ont., 2909b
 Woodward, Calvin M., 2245a
 Wool and Woollen Manufacture, 2909b
 Woolflower, Chinese, 2910b
 Woolworth Building, 2567a
 Woonsocket, R I., 2910b
 Worcester, Mass., 2911a
 Worden, John Lorimer, 2911b
 Word Study, 2045b
 Wordworth, William, 2911b
 Work, 2912b
 Workhouse, 2912b
 Work men's Compensation Laws, 1222a
 World's Columbian Exposition, 2912b
 World Court, 2790a
 World War, 200a, 281a, 2913b
 Worms, 2758b, 2861b, 2946b
 Worms, Diet of, 2190b, 2946a
 Worms, Germany, 2847b
 Wormseed, 1537a
 Wormwood, 2947a
 Worsted, 2847a
 Wot, 562b, 1062b, 2861b
 Wounds, 2847a
 Wreck of the Hesperus, 2043a
 Wren, 2947b
 Wren, Christopher, 2947b
 Wrench, 2948a
 Wrestling, 2948a
 Wright, Carroll D., 2949a
 Wright, Frank Lloyd, 2949a
 Wright, Harold Bell, 2949a
 Wright, Orville and Wilbur, 1361b, 2849a
 Wrinkles, 2443a
 Writ, 2949b
 Writing, 2849b
 Writ of Assistance, 2950a
 Wrynne, 2950b
 Wurtemberg, Germany, 2950b
 Wyandotte Cave, 2950b
 Wyandotte Indians, 2740b
 Wycliffe, John, 2951a
 Wycliffe's Bible, 2951b
 Wyoming, 2951b
 Wyoming, University of, 2954b
 Wyoming Valley Massacre, 2954b

X

X, 2955a
 Xanthippe, 2955a
 Xavier, Francisco de, 2123a, 2955a
 Xenia, Ohio, 2955a
 Xenophon, 2955b
 Xerxes, 2795a, 2955b
 X-Ray, 2091a
 Xylophone, 2956b
 X Y Z Correspondence, 2956b

Y

Y, 2957a
 Yabloni Mountains, 2957a
 Yacht and Yachting, 2957a
 Yak, 2957b
 Yakima, Wash., 2958a
 Yakima Indian, 2958a
 Yale, Elinor, 2958b
 Yale University, 2958a
 Yalu River, 2958b
 Yam, 2958a

Yancey, William Lowndes 3958b
 Yang-tse-Kiang River 3958b
 Yankee, 3958b
 Yankee Doodle, 3960a
 Yankton S. D., 3960a
 Yaputa River, 3978b
 Yagui Indians 3960a
 Yarkland 3960a
 Yarmouth, Nova Scotia 3960b
 Yarrmouth England 3960b
 Yarn 3960b
 Yates Richard 3961a
 Yazoo Delta 3961a
 Yazoo River, 3961a
 Year 3961a
 Yeast, 3961a
 Yeats, William Butler, 3961b
 Yellow 3961b
 Yellow Artimony, 140b
 Yellowbird 110b
 Yellow Fever, 3971b
 Yellow Fever Mosquito 3971a
 Yellow-Panther 3971b
 Yellow Head Pass, 72a 3971a
 Yellow Jacket, 3971a
 Yellow Jasmine 3971b
 Yellowlegs 3971a
 Yellow Lion, 3971b
 Yellow Sea, 3971a
 Yellowstone National Park 3971a
 Yellowstone River, 3971b
 Yellowtail 3971a
 Yellow Tiber 3971b
 Yemen, Arabia 3971b
 Yen 3971a
 Yentzel River 3971a
 Yerba Mate 3971b
 Yerkes Charles T. 3971a
 Yerkes Observatory, 3971a
 Yew 3971a
 Yezdrail 3971b
 Yiddish 3971a
 Yoko Park 3971b
 Yokohama, Japan 3971b

Yonre Charlotte Mary, 3968b
 Yonkers, N. Y., 3967a
 York Eng 3967a
 York, House of, 3118b, 3967b
 York Pa 3967a
 Yorktown Va 3967b
 Yosemite National Park and Valley 3967a
 Yoshi-hito Harunomia, 3968b
 Young Brigham 2413b 3178a
 Young 3968b
 Young Charles Augustus 3968a
 Young Edward, 3968a
 Young Ella Flare 3968a
 Young Itab 3968b
 Young Men's Christian Association 3968b
 Young Pretender The 3452a
 Youngstown Ohio 3971a
 Young Turk 3971a 3971a
 Young Women's Christian Association 3971a
 Ypres Battle of 3971a
 Ypres Belgium 3971a 3971b
 Ypsilanti Mich 3971b
 Ysaye Eugene 3971a
 Yuen Chi Kai 3971a
 Yucatan 3971b
 Yucca, 3971b
 Yukon River 3971b
 Yukon Territory, 3971a
 Yuma, 3971b

Z

Z 3971a
 Zambesi River 3971a
 Zanesville Ohio 3971b
 Zangwill, Israel 3971b
 Zanzibar, Island and Town 3971a
 Zealand 3971a
 Zebra 3971a
 Zeebrugge, Attack on, 3971b

Zebu 3975b
 Zebulon, 3975b
 Zechariah, 3975b
 Zedekiah, 3975b
 Zehner, Fannie Bloomfield, 3975b
 Zemstvo 3975b
 Zemstvo Union, All-Russian, 3144b
 Zenana 3976a
 Zenda-Alexia, 3976a
 Zenith 3976a
 Zeno, 3976a
 Zenobia, 3976a
 Zephthra Prince's 11a
 Zephaniah 3976b
 Zephyrus 31a
 Zepelin Ferdinand, 3976b
 Zepherin Dirigible Balloon, 3976a
 Zera 3976b
 Zeus (mythology), 1918b
 Zeuxis 3976a 3976b
 Zine 3976a
 Zine Ditch, 3976a
 Zinnia 3976b
 Zion 1888b
 Zion Church 42b
 Zionist Movement, 3976b
 Zirconium 3976b
 Zither 3976b
 Zodia 1165b 3976b
 Zodiack Light 3976b
 Zola Luntie 3976a
 Zollverein 3976a
 Zora 3976b
 Zoological Garden, 3976b
 Zoology 3980a
 Zorn Anders Leonhard, 3987a
 Zoraster 3987b
 Zouave 3987b
 Zouder See 3987b, 3987b
 Zulus 3988a
 Zuni 3988a
 Zurich Lake 3988b
 Zurich Switzerland 3988b
 Zwingle, Ulric, 3941a, 3988b